LAVINA® 38GR -S User Manual

SUPERABRASIVE

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TABLE OF CONTENTS

Table of Contents 2
1. GENERAL INFORMATION 3
Manufacturer 3
General Description 3
Machine characteristics 3
Lavina® 38GR-S Main design 3
Environmental Conditions 4
Vacuum Connection 4
Technical Data 4
Vibrations 4
Sonorous Emissions 4
Label Data 4
Customer Service 4
2.SAFETY ISTRUCTIONS 5
Recommended Use 5
Prohibited Use 5
Preparation for work 5
Protection Devices 5
Arrest Functions 5
Safe Use 5
PROPANE SAFETY 5
FIRE SAFETY 5
Emissions 5
Hazard Communication 5
Local Agencies and 6
regulations 6
Residual Risks 6
Before You Begin 6
Operating Machine 6
After Work is completed 7
The Work Area 7
PERSONAL PROTECTIVE Equipment (ppe) 7
Testing 7
Operator 7
Propane cylinders 7
REFUELLING Cylinders 8
Storage Cylinders 8
Transporting Cylinders 8
3. HANDLING AND TRANSPORTATION 8
Positioning the handle 8
USING THE STEERING BRACKET 9
Flipping the machine up 9
Lifting 10
Third wheel 10
RELEASINGING THE WHEELS OF THE CARRIAGE 10
Storage 10
4.OPERATION 11
Preliminary Controls 11
Control of the waterflow 11
Adjusting and Mounting Tools 11
FRAME BLOCKING (u-joint) 11
Remote CONTROL PANEL 11
Local CONTROL PANEL 12
INDICATION UNITS ON THE ELECTRICAL CABINET 13
Starting the Machine 13
Operating the Machine 13
Stopping the Machine 14
Alarm 14
5.TOOLS AND ACCESSORIES 14
Tool holder key 14
Foam Plate 14
Security plate for Quickchange pads 14
6. POPULAR TOOLS 15
7. EXPLODED VIEW 16
General Exploded View (fig.7.1) 16
TOOL HOLDER FOR MACHINES Exploded View (fig.7.2) 16
Top COVER ASSEMBLY and MOTOR SUPPORT Exploded View (fig.7.3) 16
PLANETARY DRIVE Exploded View (fig.7.4) 16
BOTTOM COVER ASSEMBLY Exploded View (fig.7.5) 17
TRANSMISSION BELT Exploded View (fig.7.6) 17
PULLEY UNIT Exploded View (fig.7.7) 17
CENTRAL SHAFT BEARING Exploded View (fig.7.8) 17
Top Cover Exploded View (fig.7.9) 18
Tool Holder Exploded View (fig.7.10) 18
Carriage Exploded View (fig.7.11) 18
STEERING BRACKET Exploded View (fig.7.12) 18
8. MAINTENANCE AND INSPECTION 19
REMARK 19
Cleaning 19
Check Daily 19
Check and replace after the first 8 Working Hours 20
Always use 30HD or 10W30 engine oil with all of the following ratings: SF, SG, and CC 20
Check and replace Every 50 Working Hours 20
Check Every 200 Working Hours 20
Check Every 400 Working Hours 20
Check Every 1000 Working Hours 20
Vacuum 20
Water Leaks 20
Electrical System 20
Mechanical Parts 20
CARRIAGE WHEELS 21
BATTERY OF THE DRIVING 21
Baterry of the PANEL 21
Lavina®38GR-S Electrical sYstem 22
9. TROUBLESHOOTING 28
Index of Problems and Solutions 28
9.1 ENGINE 28
9.2 CHECKING AND CHANGING OIL 28
9.3 separating the HeaD FROM the CARRIAGE 28
..... 29
9.4 dismounting/mounting the engine 30
9.5 Replacing the clutch 30
9.6 DISMOUNTING AND MOUNTING TOOL HOLDERs TO CHANGE BUFFERS AND SPIDERs, CHANGING V-RINGS AND FELT-RINGS 31
9.7 Tensioning used planetary Belt 32
9.8 Mounting and tensioning a new planetary belt 33
9.9 tensioning and replacing the motor support belts 33
9.10 tensioning and replacing the TRANSMISSION BELT 36
9.11 replacing the PULLEYS 36
9.12 replacing the wheel 37
9.13 replacing the BATTERY 37
9.14 replacing the Water tank 37
..... 37
10. WARRANTY AND RETURNS 41
Return Policy for Lavina® 38GR-S 41
11. DISPOSAL 41
12. MANUFACTURER'S CONTACTS 41
13. SPARE PARTS 42
13.1. LAVINA®38GR-S General Parts 42
13.2. LAVINA®38GR-S TOOL HOLDER FOR MACHINES Parts 42
13.3. LAVINA®38GR-S Top COVER ASSEMBLY and MOTOR SUPPORT Parts 42
13.4. LAVINA®38GR-S PLANETARY DRIVE Parts 43
13.5. LAVINA®38GR-S BOTTOM COVER ASSEMBLY Parts 43
13.6. LAVINA®38GR-S TRANSMISSION BELT Parts 44
13.7. LAVINA®38GR-S PULLEY UNIT Parts 44
13.8. LAVINA®38GR-S CENTRAL SHAFT BEARING Parts 44
13.10 LAVINA® 38GR-S Engine Base Parts 45
13.11. LAVINA®38GR-S Carriage Parts 46
13.12. LAVINA®38GR-S STEERING BRACKET Parts 47
13.13 LAVINA®38GR-S Tool Holder Parts 47
13.14 LAVINA® 38GR-S Engine parts 48
13.15 LAVINA® 38GR-S Tank assembly parts 48
LAVINA®38GR-S Control Box Parts 49

1. GENERAL INFORMATION

This owner's manual is intended for the operator of the Lavina® 38GR-S machine, the servicing technician as well as for anyone involved with operating or servicing the machine. We recommend that you read the instructions very carefully and follow them strictly. The manual includes information about assembling, using, handling, adjusting and maintaining your Lavina® 38GR-S floor grinding and polishing machine.

MANUFACTURER

Superabrasive was founded in 1987, as a manufacturer of high quality diamond tools for the stone and concrete industry. Today, Superabrasive is one of the world's leading companies in the production of diamond tools and floor grinding machinery. At Superabrasive, we strive to deliver the very best solutions to our customers, and enable them to work more efficiently.

GENERAL DESCRIPTION

The Lavina® 38GR-S machine is intended for grinding, polishing and buffing concrete, marble, granite, limestone and terrazzo surfaces with diamond tools.
The Lavina® 38GR-S is a three-disc machine with remote control, and can be used dry as well as wet.
For best results, use only tools manufactured or recommended by Superabrasive and its distributors.

WARNING!

The Lavina® 38GR-S machine is manufactured and fitted for the above-mentioned applications only! Every other use may possess risks to the persons involved.

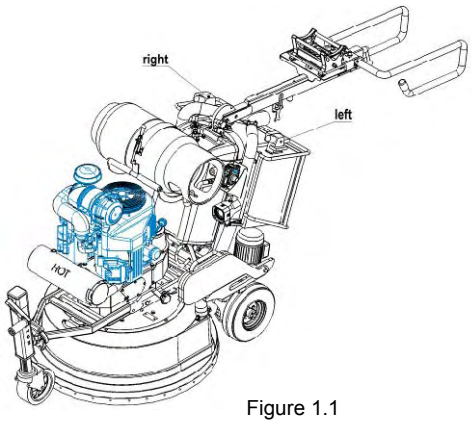


Figure 1.1

MACHINE CHARACTERISTICS

The Lavina® 38GR-S is made of two main component sections:

LAVINA® 38GR-S MAIN DESIGN

The two main component sections, the carriage and main head.
The wheels of the carriage are driven by two gear boxes that allow working with the machine from distance. The handle on the frame is adjustable in height and enables the operator to work in a correct and safe posture.

Figure 1.2

Two halogen spotlights (Fig.1.2) enable the operator to work in darker areas. The lamp holder can be adjusted in different positions.

⚠ WARNING Existing lighting system does not replace adequate overhead lighting.

A **frame (U-joint technology)** on top of the motor base is providing the main head a possible to move to all sides and it gives more grinding capacity.

Remote Control Unit (fig.1.3)

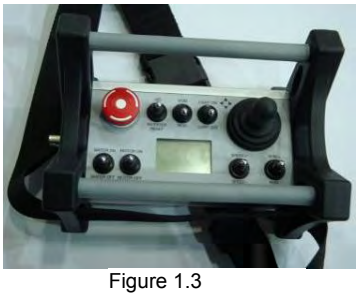


Figure 1.3

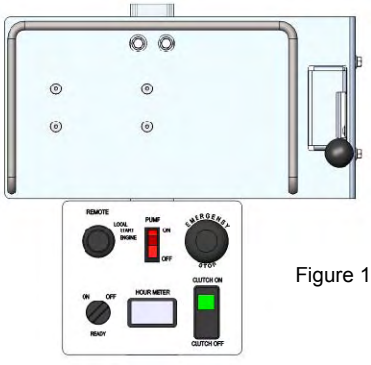


Figure 1.4

The control panel for local operations (fig.1.4) is positioned on top of the frame and contains switching devices, which ensure the proper functioning of the engine, LPG supply turning on/off of the electromagnetic connector/clutch.
electrical box (fig.1.1) contains the electric switching devices and inverters. There are two plugs on the top side of the box. The left (the small one) includes the control circuits of the engine, the generator and the gas valve. The **main feeding cable** is connected with a plug and socket on the right side of the box. **The baterry** is situated under the elecrtrical box.

The water tank is on the opposite side of the frame, so that the weight of the water has no influence on the operation of the machine. The water from the tank is supplied by a pump. The frame weight, on the other hand, is fully absorbed by the driving wheels.

The propane tank is placed on a tank holder on the backside of the frame.

The Engine Kawasaki FX921V with electric clutch is mounted on the base plate and it is driving the three heads with a belt system.

The **planetary head** is driven by a flat belt.

The machine has a third wheel which ensures easier movement. (Fig.1.1)

ENVIRONMENTAL CONDITIONS

The temperature range for operating the Lavina® 38GR-S outdoors is between 41°F and 86°F or 5°C and 30°C. Never use the Lavina® 38GR-S during rain or snow when working outdoors. When working indoors, always operate the machine in well-ventilated areas.

VACUUM CONNECTION

A connection for a vacuum dust extractor is located on the carriage. The Lavina® 38GR-S does not include a vacuum dust extractor. The customer must purchase the vacuum dust extractor separately. The hose of the vacuum extractor must be Ø 76 mm/3 Inch and can be glided over the three-way pipe. The vacuum dust extractor must be adapted for floor grinders and have a minimum air displacement of 500m3/h with a negative vacuum of 21 kPa.

TECHNICAL DATA

	LAVINA® 38GR-S	
Engine	**Kawasaki FX921V**	
Capacity of engine	**999cc**	**61.0cu.in**
Power	**23.1 kW**	**31 HP**
Tool holder rpm	**416-750 rpm**	
Engine rpm	**2000-3600 rpm**	
Working width	**965.2 mm**	**38"**
Tool holder diameter	**3 x 335 mm**	**3 x 13.2"**
Weight	**632 kg**	**1393 lbs**
Grinding pressure	**260; 320; 350 kg**	**573;705; 771 lbs**
Application	**wet and dry**	
Vacuum hose port	**76 mm**	**3"**
Water attachment	**Quick change for ¾" hose**	
Water tank capacity	**46 l**	**12 gal**
Propane tank capacity	**15.2 kg**	**33.5 lbs**
Water feed	**Peripheral and front stream with pump**	
Third wheel	**yes**	
AMG Battery	**12V/35AH**	
Remote control battery	**Rechargeable battery size AA 1.2V**	
Machine LxWxH	**2800x1000x1350 mm**	**110.2"x39.4"x53.1"**
Packing LxWxH	**1565x1100x1680 mm**	**61.6"x43.3"x66.1"**

VIBRATIONS

The vibrations of the machine are within the limits of directives and harmonized standards from the European Union when the Lavina® 38GR-S is operated with the recommended tools and in normal conditions.

SONOROUS EMISSIONS

The sonorous emissions are within the limits of directives and harmonized standards from the European Union when the Lavina® 38GR-S is operated with the recommended tools and in normal conditions. However, as previously stated, the operator must wear ear protectors.

LABEL DATA

The data on the label provides the correct voltage, kW and RPM (needed for operational purposes);
Weight (needed for transportation purposes); production year and serial number (needed for maintenance purposes).

CUSTOMER SERVICE

For customer assistance and technical support call your local distributor or call Superabrasive Inc. at 1-800-987-8403 or visit us at www.superabrasive.com , where you can download a copy of this manual.

2.SAFETY ISTRUCTIONS

RECOMMENDED USE ⚠ WARNING

The Lavina® 38GR-S machine is designed and manufactured to grind and polish concrete, terrazzo and natural stone floors. It can be used for renovations as well as for polishing. The machine is designed for dry or wet use. When using it dry, use a vacuum of appropriate size. For more information, please refer to the chapter on handling the vacuum connection.

PROHIBITED USE ⚠ WARNING

The machine MUST NOT be used:
For applications different from the ones stated in the General Description chapter.
For not-suitable materials.
In environments which:
Possess risks of explosion
Possess high concentration of powders or oil substances in the air
Possess risks of fire
Feature inclement conditions.
Possess electromagnetic radiation.
In nursing homes, hospitals, day-care centers, etc
In areas where loose tiles or other objects are preventing proper use of the machine.
In rooms without proper ventilation

PREPARATION FOR WORK ⚠ WARNING

Make sure that:
You have closed the work area, so that no person unfamiliar with operating the machine can enter the area
The tool plate and tools are adjusted to the machine properly
There are no missing parts of the machine
The machine is in upright working position
The protection devices are working properly.

PROTECTION DEVICES ⚠ WARNING

The machine is equipped with several protection devices including the following:
An emergency stop button
A protection skirt and a hood for protecting the tool plates.
These devices protect the operator and/or others persons from potential injuries. Do not remove them. On contrary, before using the machine, please ensure that all protection devices are mounted and function properly.

ARREST FUNCTIONS ⚠ WARNING

Functions of arresting of the machine are following:
Switch to stop the engine
Button to stop the grinding movement
Close the propane tank

SAFE USE ⚠ WARNING

The Lavina® 38GR-S is designed to eliminate all risks correlated with its use. However, it is not possible to eliminate the risks of an eventual accident with the machine. Unskilled or uninstructed operator may cause correlated residual risks. Such risks are:
Position Risks due to operator's incorrect working position
Tangling up Risks due to wearing inappropriate working clothes
Training Risks due to lack of operational training
NOTE: In order to reduce all consequences of the above-mentioned risks, we advise that machine operators will follow the instructions in the manual at all times.

PROPANE SAFETY ⚠ WARNING

Propane is a flammable gas whose vapors are heavier than air. As is the case with gasoline, propane can explode if the proper cautions are not heeded. Propane is odorized with an agent having a distinct odor that is recognizable at very low concentrations. This helps in identifying leaks, even when they are small.

Awareness and basic safety precautions are required when working with propane. As long as these precautions are followed, risk is negligible. Ignorance, however, could pose needless risk.

The two greatest hazards with propane powered floor care machines are:

- Carbon Monoxide Poisoning: This is the most frequently reported incident associated with propane powered floor care machines and is caused by excessive exhaust emissions. The symptoms are headache, dizziness and nausea. A major cause involves engines with poor preventive maintenance practices, usually those with dirty air filters and machines operated in confined areas without adequate ventilation. Another cause may be substandard, inexpensive machines with no emissions control technology and improperly set carburetion.

- Overfilled Fuel Cylinders: Nearly all fire related incidents reported result from bringing a cylinder into a building without first checking for overfill. This action is dangerous, unwise, and unnecessary.

FIRE SAFETY ⚠ WARNING

Be aware of the potential dangers of fire or explosion when using propane, and take normal fire-safety precautions.
Fire: There is a possibility of fire from LPG vapor leaking or venting from fuel cylinders or carburetion equipment.
Explosion: LPG vapor concentrated or confined to a small, restricted space may explode or ignite.
Propane may experience a **BLEVE**, a boiling liquid expanding vapor explosion.

EMISSIONS ⚠ WARNING

All propane powered floor care machines produce emissions. Most are harmless, but some are dangerous and can be fatal. Carbon monoxide (CO) poses the greatest risk, since CO can be lethal within as little as 30 minutes exposure at 3,000 parts per million (ppm) concentration.

Carbon monoxide is an invisible, odorless, colorless gas created when fossil fuels (such as gasoline, wood, coal, propane, oil and methane) burn incompletely.

HAZARD COMMUNICATION ⚠ WARNING

A Material Safety Data Sheet for propane shall be posted in all buildings where propane will be used.

Because propane is odorized, it is easily detected at levels of just a few parts per million, which is much less than the exposure limit of 1000 parts per million.

If you smell propane while operating a propane floor care machine, do the following:

Stop the engine:

1. Pull the throttle to the stop position (if present) or turn the key switch to the off position.
2. Shut off the service valve on the propane cylinder.
3. Move the floor machine to a well-ventilated area.
4. Remove the cylinder from the machine and take it outside the building.
5. If the cylinder is leaking, contact a DOT approved repair shop to determine the cause of the leak and have the shop, not you, repair it.

If a fire occurs while the machine is being operated, do the following:

1. Stop the engine: pull the throttle to the stop position (if present) or turn the key switch to the off position.
2. Shut off the service valve on the propane cylinder if possible. Be careful not to be burned.
3. Move the machine outside if possible. If not possible, move it to a well-ventilated area away from flammable materials.
4. Do not attempt to extinguish the flame from a gas leak. If you do, the gas will build up in the area and could re-ignite. Starve the fire by shutting off the supply of gas.
5. Have the machine and cylinder inspected before using them again.

LOCAL AGENCIES AND REGULATIONS

⚠ WARNING

- **NFPA**

Operating a propane powered floor care machine requires compliance with certain safety regulations. The National Fire Protection Agency (NFPA) Standard for Storage and Handling of LP Gas is the appropriate authority for safe propane use. A copy of this publication is available through the NPFA in Quincy, MA (1-800-334-3555).

Among its regulations, NFPA #58 requires that all personnel employed in the handling of propane gas be trained in its proper handling and operating procedures. It also requires them to carry a written certification from their employer or training supervisor to attest to such training. Although this is directed mainly to those who fill and transport liquid propane gas, Onyx Environmental Solutions recommends that operators of propane powered floor care machines in public places be trained and certified as well.

With regard to operation of propane powered floor care equipment, even though NFPA 58 8-4.5 says "these machines shall be permitted to be used in buildings frequented by the public, including the times when such buildings are occupied by the public," Onyx Environmental Solutions suggests usage when occupancy of a given work area is minimal.

- **CARB / EPA**

The California Air Resource Board (CARB) and Environmental Protection Agency (EPA) also set limits for propane-powered engines used outdoors, but CARB/EPA approval does not signify that the engine is safe to use indoors.

- **CGA**

The Canadian Gas Association (CGA) has set a limit of 1500 ppm CO in exhaust flow.

- **OSHA**

For propane powered machines used indoors, the Occupational Health and Safety Administration (OSHA) has established a limit of 50 ppm CO for 8-hour time weighted average (TWA) in ambient air and is considering a limit of 800 ppm CO in exhaust flow.

- **DOT**

The Department of Transportation (DOT) has established regulations regarding the safety of fuel cylinders including the ones used on propane powered floor care machines.

- **Local Agencies**

Local law enforcement agencies such as the local Fire Marshall also rely on independent testing labs such as UL and CGA before giving their approval of the use of some equipment. These labs thoroughly test equipment and submit their stamp of approval only after rigorous testing. While not being required by all law enforcement agencies, the stamp of approval by these agencies further assures the operator that he or she is working with and around safe equipment.

NOTE: In order to reduce all consequences of the above-mentioned risks, we advise that machine operators will follow the instructions in the manual at all times.

RESIDUAL RISKS ⚠ WARNING

During the normal operating and maintenance cycles, the operator is exposed to few residual risks, which cannot be eliminated due to the nature of the operations.

BEFORE YOU BEGIN ⚠ WARNING

Working area must be clear from any debris or objects.

A first-time operator must always read the manual and pay attention to all safety instructions.

All propane connections and cables must be inspected for potential damages.

Ground wire system of the power supply must be also inspected.

Perform general daily inspections of the machine and inspect the machine before each use.

Always inspect the safety devices:

The emergency break must be clear and working

The tool protector must be working

The machine must be clean

Never operate the machine in the rain!

Confirm that there are no missing parts especially after transportation, repair or maintenance.

Before filling the water tank with water make sure the machine is not working and the main switch is turned off.

Before turning on the machine make sure that the base is placed on the floor, the machine MUST NOT be in an upright position when turned on!

OPERATING MACHINE ⚠ WARNING

Never work with the machine without visual contact with it.

Never run the machine when you are situated between the handles of the wheel

When operating the Lavina® 38GR-S, make certain that there is no one, but you around the machine.

Never leave the machine unattended while working.
The water hose must move freely and must be damage-free.
Check if the floor, you work on, is not too uneven. If this is the case, it may damage the machine.

AFTER WORK IS COMPLETED ⚠ WARNING

Clean the machine and its surroundings properly
Empty and clean the water tank
Store the machine in a safe place
Place the Propane bottle outside in its storage

THE WORK AREA ⚠ WARNING

Make certain that people or vehicles do not enter the work area.
Avoid cables and hoses being in the way.
Always check the floor for debris

PERSONAL PROTECTIVE EQUIPMENT (PPE) ⚠ WARNING

Always wear safety shoes when working with the machine.
All personnel in the immediate work area must wear safety glasses with side shields.
Always wear safety gloves when changing the tools.
Always wear clothes suitable for the work environment.
Always wear Carbon Monoxide Indicator badges as an extra precaution.
The plastic indicator contains a colored indicator button that darkens in the presence of Carbon Monoxide. The relative darkness of the indicator button indicates the level of CO in the ambient atmosphere. Most indicator badges have a useful life of 30 days, depending on the concentration of contaminants, humidity, and temperature.

TESTING ⚠ WARNING

There are a great number of instruments offered on the market to test for toxic gases. Only those designed to read carbon monoxide resulting from combustion engines is considered acceptable for testing exhaust emissions from propane powered floor machines.

Some instruments are used to read "ambient air" and may be damaged if used to take readings in the muffler or tail pipe. Selecting the proper instrument is an important part of meeting the testing requirements.

Generally speaking, units capable of reading in ppm, (parts per million), at ranges from 0 to 1000 are adequate for checking ambient air (air in the breathing zone of the operator). Instruments capable of testing carbon monoxide in the exhaust should be able to read from 0 to at least 2000 ppm and should be certified by the manufacturer for that purpose.

Some instruments and systems used for these purposes are:

1) AMBIENT AIR MONITORING
   DRAGER Model 190: Manufactured by National Drager.
   SENSIDYNE gas sampling system with YB-11038 Sensidyne dectector tubes
   DRAGER gas sampling system with YB-4620 Drager detective tubes
   GAS-TECH Model CO-95
   ENERAC POCKET 60: Manufactured by Energy Efficiency System
2) ENGINE EXHUAST ANALYZERS
   HORIBA GAS ANALYZER
   ENERAC 2000 COMBUSTION ANALYZER
   ENERAC POCKET 60
3) DATA LOGGERS
   INDUSTRIAL SCIENTIFIC CORP. MODEL STX-70 CO MONITOR, Data-Logger
   BIOSYSTEMS INC. "TEXILOG" Data-Logger

- All instruments used for testing must be calibrated at intervals recommended by the manufacturer. The monitor, model number and date of calibration will be recorded with all test results.

OPERATOR ⚠ WARNING

The operator Lavina® 38GR-S machine must have an adequate technical knowledge and preparation.
The operator must know the machine's work environment.
Only one operator at a time can work with the machine.
The operator must be properly trained and well instructed prior operating the machine.
The operator must understand all the instructions in this manual.
The operator must understand and interpret all the drawings and designs in manual.
The operator must know all sanitation and safety regulations pertaining to the operation of
The operator must have floor grinding experience.
The operator must know what to do in case of emergency
The operator is expected to operate their equipment safely and responsibly. They are responsible for the proper handling and storage of propane cylinders, identifying potential hazards associated with his job and avoiding these hazards at all times.

PROPANE CYLINDERS ⚠ WARNING

The Propane cylinders are constructed of either aluminum or steel. We recommend aluminum because it is lighter and guards against rusting. The cylinder used on propane powered floor machines is classified as a 4E240 cylinder. Its rated capacity is 33.5 lbs. and this designation refers to the model of the cylinder. Actual propane capacity achieved during filling can be less than, equal to, or slightly more than 33.5 lbs. Use only UL, CTC/DOT listed cylinders.

The propane cylinder used on the floor machine is a motor fuel cylinder as listed by the Department of Transportation. Unlike the common 33.5-lb propane outdoor grill cylinders (which are not legal for use on propane floor machines), the motor fuel cylinder has a number of safety systems designed into it to ensure your safety at all times.

There are two types of 33.5 lb. motor fuel cylinders.

Liquid draw
Vapor draw

The liquid draw cylinder is used on larger vehicles like forklifts. These machines have special vaporizing carburetors to allow the propane to change from a liquid to a gas before being burned in the combustion chamber.

The vapor draw cylinder is used on small machines like the propane powered floor care machines. The vacuum generated by the engine draws up the Propane gas vapor through the fuel system. The propane powered floor care machine does not have an evaporating system and will freeze up if liquid propane is introduced to it. It is necessary that special attention be paid to ensure that neither the liquid nor the vapor draw cylinders be overfilled.

REFUELLING CYLINDERS ⚠ WARNING

The proper filling of propane cylinders is a subject so important that it warrants special attention. Propane cylinders should only be filled by qualified propane dealers.

Most important, propane cylinders should be filled no more than 80% of their rated capacity. The other 20% is called the vapor space or headspace. This vapor can be compressed without causing the pressure relief valve to open and vent gas to the area around the cylinder. If there is no headspace to allow for fuel expansion, the pressure relief valve will open, releasing propane gas into the atmosphere. This is a very dangerous and volatile situation as there is always the possibility that enough of the vented gas could find its way down to the floor and come in contact with a pilot light from a furnace, hot water heater, or other source of ignition. Propane changes into a gas, is -44º F (-42º C). Exposing unprotected skin to propane gas or liquid could result in frostbite injury.

All new cylinders should be vented and purged of air per manufacturer's instructions before use. Never bleed propane cylinders indoors.

STORAGE CYLINDERS ⚠ WARNING

When not in use, propane cylinders always should be stored outside in an upright position in a secure, tamperproof, steel mesh storage cabinet. This cabinet may be located next to the building but with at least five feet (1.5 m) of space between the cabinet and the nearest building opening (door or window), also away from heat and direct sunlight.

Do not install the cabinet near a stairway or street elevator as vented propane gas will seek a lower level since it is heavier than air and could find its way into the basement of the building. Do not store cylinders full or empty inside a building or inside a vehicle. Although it is unlikely that propane will vent from a stored cylinder, if it should, the vapor could come in contact with an ignition source such as a spark from a power tool or other appliance and create a flash fire.

Do not smoke or use a device with an open flame when handling or transporting propane cylinders.

TRANSPORTING CYLINDERS ⚠ WARNING

When transporting cylinders to a propane dealer or to a job, make sure the cylinders are securely fastened and standing in an upright position with the service valve closed.

A cylinder rattling around in the back of a vehicle and banging into other objects constitutes a hazard. Avoid dropping or banging cylinders against sharp objects.

The propane cylinders are sturdily constructed but a series of hard jolts could cause damage.

Please note that any cylinder that has been filled is always considered full, no matter how little propane gas remains in it. This is because even when all liquid has evaporated into vapor there is still some propane gas vapor left in the cylinder. Because this remaining fuel is flammable, an empty cylinder should be treated with the same careful procedures as one that is filled to the 80% level with liquid propane. The only time that a cylinder is considered empty is when it is new, before it has been filled with propane.

When transporting a propane powered floor machine, the propane cylinder may be strapped onto the machine as long as the machine itself is firmly secured in the vehicle.

Of course, spare cylinders should always be secured in an upright position

3. HANDLING AND TRANSPORTATION

POSITIONING THE HANDLE

Figure 3.1

Figure 3.2

Figure 3.3

USING THE STEERING BRACKET

By loosing the swivel bolt (Fig. 3.1-2), turn the steering bracket (Fig. 3.1-3) in position. To turn the steering bracket down (Fig. 3.1-3) you have to turn loose the swivel bold (Fig. 3.1-2), and push it in, this for security reasons.

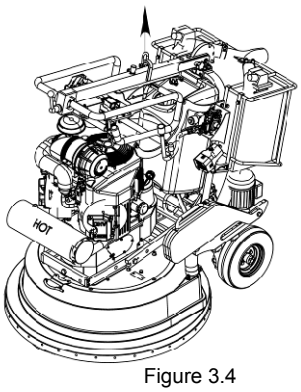


Figure 3.4

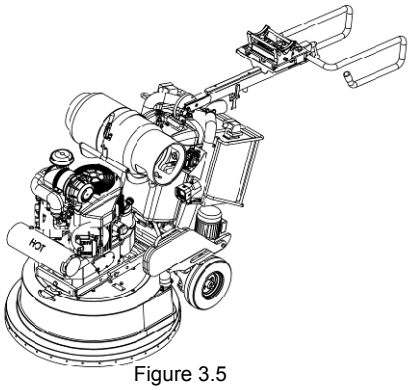


Figure 3.5

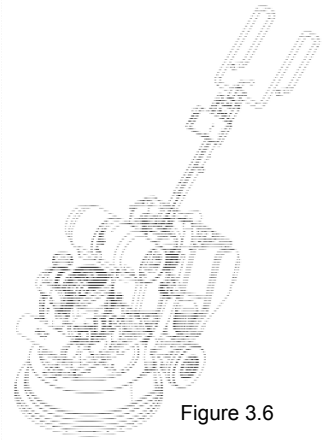


Figure 3.6

The handle can be positioned in three positions:
Transport position to store or to transport or to hoist the machine (fig. 3.4)
Working position (fig. 3.5) and Flipping position (fig. 3.6)

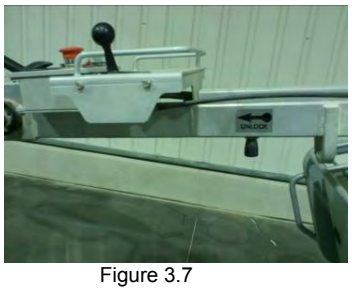


Figure 3.7

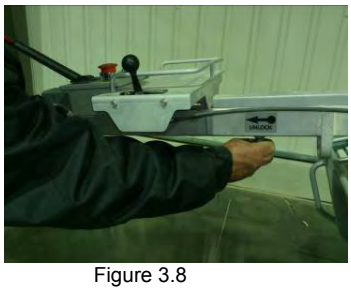


Figure 3.8

Figure 3.9

To change the handle positions pull the knob (Fig. 3.1-1, Fig. 3.7, and Fig. 3.8),
move the handle up or down.

To choose the transport-position pull the additional the security pin (Fig. 3.4, Fig. 3.9) out and put it back in when the handle is in position. Never lift the machine on the handle without mounting this pin.

FLIPPING THE MACHINE UP

To change the tools put the handle in the flipping (upright) position (Fig. 3.10), grab the steering bracket and pull the machine with all your bodyweight down (one foot on the control box can help) Put the bracket down on the floor (Fig. 3.11) and change tools. While putting the machine down a foot on the control box helps again.

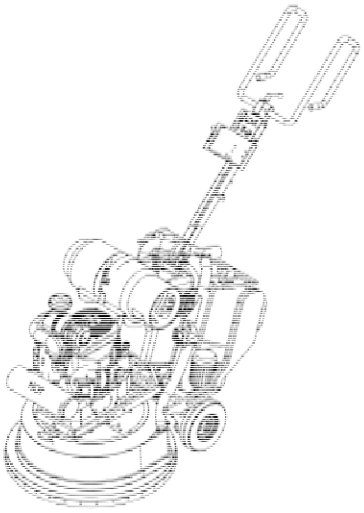


Figure 3.10

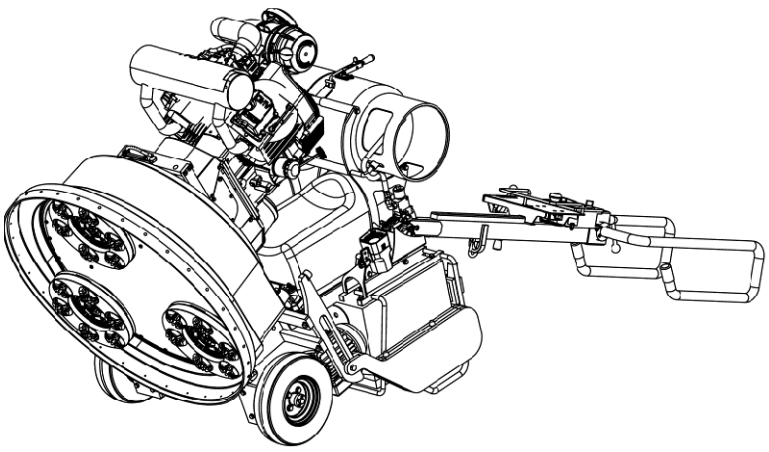


Figure 3.11

LIFTING

Lifting the machine by crane is possible by using the hoisting ring mounted on the carriage (see Fig.3.12). The eye bolt and machine construction is rated only for the weight of the machine. Do not lift any other loads on the machine. Use always hoisting equipment rated for 800 kg or 1760 lbs. See to it the security pin (Fig. 3.9) is mounted.

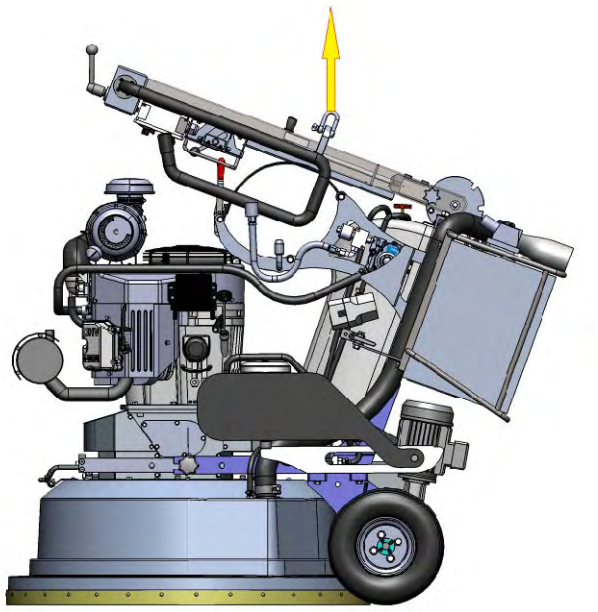


Figure 3.12

THIRD WHEEL

Lavina® 38GR-S has a third wheel for easier movement.Lift the operating part using the jack wheel and with the energy of the baterry move the machine on its own power.

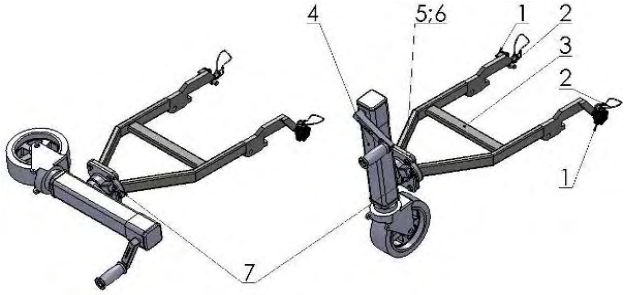


Figure 3.13

Mounting/Dismounting with Pin assembly (see Fig. 3.13 1-2). While working there is a possibility to turn the wheel support 90º(Fig.3.13).Pull out the wheel support, turn it 90 º and fix again.

RELEASINGING THE WHEELS OF THE CARRIAGE

If on some reason the movement of the machine is not possible on its own power (using the third wheel), it can be done on the two wheels of the carriage by the operator.

Each of the wheels can be released from gearing to the driven shaft by unscrewing the bolt (Fig.3.14-1) by 3 revs. This way is released the saw-edged bush, which transmits the movement between the shaft and the wheel. To unscrew the bolt you need a wrench 19mm (3/4 in) (Fig.3.15). When turning on/off the connector of the wheel is good to lift the carriage so the wheel does not touch the floor and has free rotation (Fig.3.16).

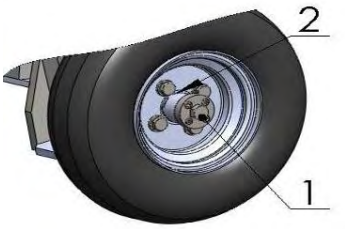


Figure 3.14

Figure 3.15

Figure 3.16

STORAGE

Always store and transport the Lavina® 38GR-S in a dry place. Never transport the Lavina® 38GR-S unprotected; it may be damaged if transported unprotected during rain or snow.

⚠ WARNING When during the storage of the machine the temperature may fall down to or less 32F (or 0° C) you should empty the water from the system using following steps:

- Pull out the hose of the tank (Fig.3.17) (Fig. 3.18 -3).
- Включете помпата и превключете крана(Fig. 3.18 -4) в двете му положения, докато излезе водата от маркучите..
- Извадете двата маркуча (Fig. 3.18 -1 и 2) и повторете отново предходната процедура. Закачете отново всички маркучи.

Figure 3.17

Figure 3.18

4.OPERATION

PRELIMINARY CONTROLS

Inspect the working area as explained in the safety instructions. For wet use, fill in the water tank when the electrical cable is disconnected. Connect the vacuum extractor and ensure that the vacuum hose is clear and it will follow the machine easily. Plug in the machine and make sure that the power cord is free to follow the working direction of the Lavina® 38GR-S.

CONTROL OF THE WATERFLOW

The operator can choose the water sprays with valve (Fig.4.2 -1)in the front (fig.4.1) when the level of the tap is in the vertical position , when the level is in the horizontal position water will spray under cover of the machine.

Figure 4.1

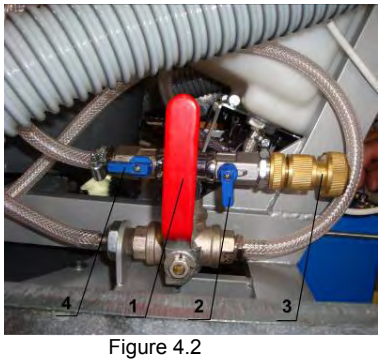


Figure 4.2

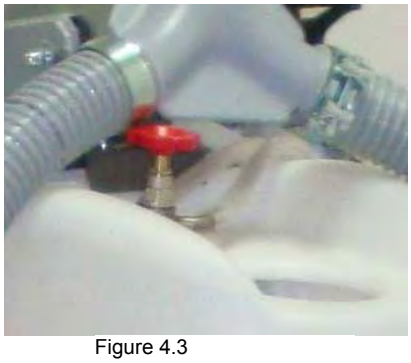


Figure 4.3

The valve (Fig. 4.2 -2) is controlling the flow of an external water supply. The valve (Fig. 4.2 -4) should be closed for external water supply, not to allow water leak to the tank. A ¾" water tube can be attached to the quick connection (Fig. 4.2 -3).
The flow regulating valve located on the tank (Fig.4.3) is increasing or reducing the waterflow to the working area – in front of the machine or under the main head cover of the machine.

ADJUSTING AND MOUNTING TOOLS

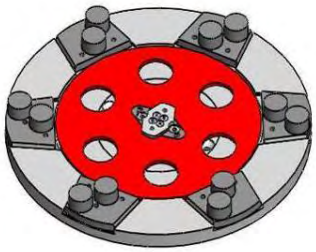


Figure 4.3

Figure 4.4

Mount the tools only after ensuring that there is nough diamond bond material left. Be sure that the plates are always clean before mounting. WARNING: Secure always the"Quickchange" pads with the security plate (Fig.4.3), lock with the tool holder key (Fig.5.3). Diamond tools with Velcro are attached on three foam plates of 13.2 inch (Fig.4.4). The foam plates are mounted on the key lock (butterfly).Always use the tool holder key (Fig.5.3).

Figure 4.5

FRAME BLOCKING (U-JOINT)

The relation between the working head and the trolley is the frame (U-joint), which allows rotation about two perpendicular axes to better follow the profile of the floor.
The movement round one of axis can be blocked with two screws to the plank, mounted on the front of the frame(Fig.4.5). Unscrew the bolts and turn the plank so it fixes the frame to the carrier with its tooth and then tighten the bolts(Fig.4.6). Thus the lateral movement of the machine is blocked.

REMOTE CONTROL PANEL

The Control Panel can work connected to the machine or as a remote control device.

Figure 4.6

Figure 4.7

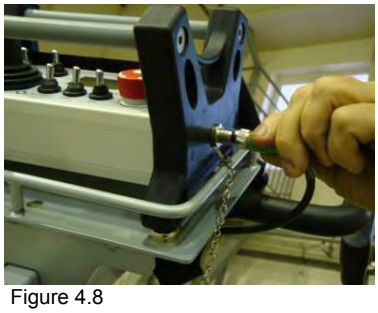


Figure 4.8

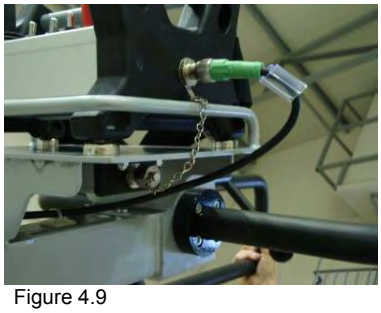


Figure 4.9

When it is connected to the machine it has to be on the support of the handle bar where on the bottom is mounted the transmitter of the panel. Unscrew the protection closure of the panel (Fig.4.6), then unscrew the nut of the plug connecting the cable to the transmitter and connect the plug to the panel (fig4.8.). Put the protection closure to the transmitter (fig 4.9).

When the panel is working as a remote control device the cable should be connected to the transmitter.

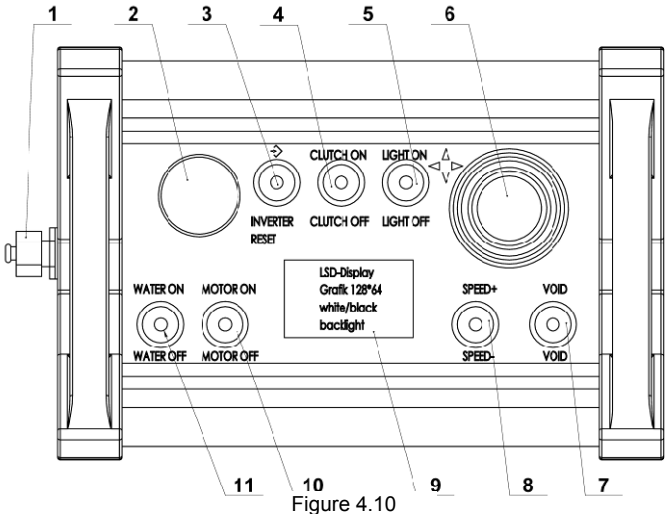


Figure 4.10

1. Plug with closure used to connect the panel to the machine through a cable

2. Emergency STOP button used in Emergency situations for stopping the machine. Turn on/off the panel**.**

3. Switch Reset

- forward position activates the initial setting on the control panel

- back position resets the alarm of the inverters

4. Start/Stop clutch Start will electronically activate the grinding plates to spin, by pushing stop it will disconnect engine from grinding heads

5. Switch on/off the spotlights

6. Joystick presets the moving direction of the machine

7. Free switch

8. Switch presets moving speed of the machine

9. LCD – Display :

- indication of the preset rotation speed of the working plates
- indication of the preset speed of the machine
- emergency stop button report
- report - "inverter fault"
- movement direction "forward"
- movement direction "back"

10. ON/OFF switch starts/stops the engine

11. ON/OFF switch control the water pump

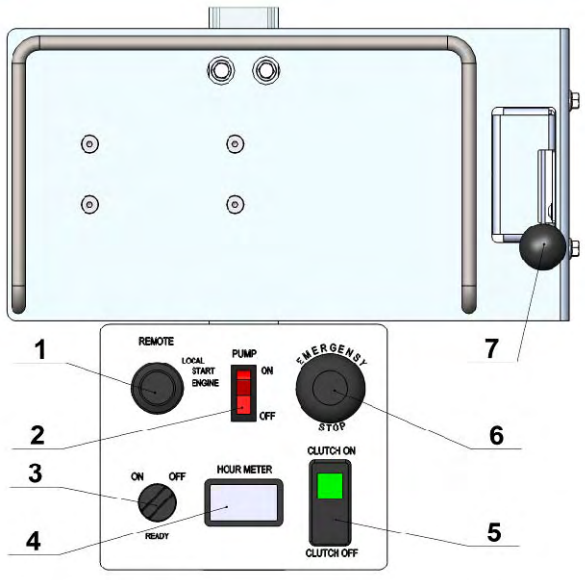


Figure 4.11

LOCAL CONTROL PANEL

1. Remote/Local/Start Engine switch

In position **"**Remote" the machine is controlled by REMOTE CONTROL PANEL.

In position "LOCAL" the REMOTE CONTROL PANEL is not functioning and the machine is controlled by the LOCAL CONTROL PANEL.

In this position the engine is in contact and it starts after switching the switch to fully right position. After releasing the switch returns to "LOCAL".

2. Water pump switch Lights orange when the water pump is working.

3. Ready switch „ON/OFF"

In position "ON" after lighting the button

The machine is supplied by the battery and is ready to work.
In position "OFF" the supply of the machine is interrupted.
This is the position in which the machine should stay when the work is finished.

4. Digital RPM/workings hours indicator When the motor runs it indicates the revolutions per minute of the motor, see the conversion table to know the rpm of the tools. When the motor does not run, it indicates the worked hours.
The hour meter will blink between 48-52 hours as a reminder for oil change.
5. Start/Stop clutch Start will electronically activate the grinding plates to spin, by pushing stop it will disconnect engine from grinding heads
6. Emergency stop button used in Emergency situations for stopping the machione.
7. Throttle Push forward to accelerate.

INDICATION UNITS ON THE ELECTRICAL CABINET

1. Indicator lamp "BATTERY" for charging the battery**.**
Lights when starting the engine and then extincts. The lighting of the lamp during operation of the engine indicates faults in the battery charging system.

2. Indicator lamp "FUEL" for LP Fuel Lockoff valve. Lights continuously during operation.

Figure 4.14

STARTING THE MACHINE

Figure 4.15

NEVER WORK WITH THE MACHINE WITHOUT VISUAL CONTACT WITH IT.
ATTENTION: Never run the machine when you are situated between the handles of the wheel. First turn the handles as shown on Fig.4.15.
If working wet, pour water on the floor. If working on dry surface, skip that step and connect and switch on the vacuum cleaner.
First, follow the directions in chapter Safety Devices and "SAFETY INSTRUCTOINS". Check oil level. Open (counterclockwise) the service valve on the propane tank about one and a half turns. Turn the switch (Fig.4.11-1) on position "Remote" and switch **Ready** on position **"ON"** and wait to light. Next, see to it the Start/Stop clutch button (Fig.4.10-4) is in stop position check the throttle (Fig.4.11-7) in the IDLE position. Check "emergency stop button" (Fig.4.11-6) to be sure that the machine is in working condition.

To start the engine press " Motor on" (Fig.4.10-10), hold untill the engine starts and then release. Set the required speed (Fig.4.10-8), push "**Clutch ON"** and with the joystick (Fig.4.10-6) chose the desired direction.

OPERATING THE MACHINE
Guide the machine in straight lines across the floor, and with each new line overlap a little bit of the previously completed surface. Work at a constant speed allowing the tools time to work at a speed appropriate for the tools' grit size. Avoid vibrations. Do not stop the machine in one spot while the tools are still working because they will leave marks on the floor surface. When working wet, preliminary chose with the water tap (Fig.4.2-1) the position for water feed and periodically start the pump (Fig 4.10-11) to release water onto the floor surface. Starting the pump is possible only if the machine motor is on. When working dry, check the floor surface periodically to ensure that dust is not accumulating on it. Check regularly if your vacuum works properly. In case you need you may turn on the lights (Fig.4.10-5).

STOPPING THE MACHINE

The machine can stop by switching the joystick in opposite position to the moving direction.

The stopping of the machine should be after the motor stops. Do not stop moving the machine before stopping the motor rotation. Otherwise it could damage the surface.

To stop the machine engine use switch "Motor off"(Fig.4.10-10). Use "Emergency stop button" only in emergency.

NOTE! Do not hold the machine in one spot before the engine stops to turn.

ALARM

The machine stops when the emergency stop button is activated or the inverters are shut down by emergency.

It is indicated by flickering lamp inbuilt in the switch **Ready „ON/OFF"**

The control panel display shows " **Emergency stop** " or "**Inverter fault**". After eliminating the accident cause the machine is reset in working condition by releasing the emergency stop or turning on the "Inverter reset"(Fig.4.10-3).

The lighting of the lamp **"BATTERY"** during operation of the engine indicates faults in the battery charging system.

Extinction of the indicator lamp **"FUEL"** during operation or lack of light during the ignition to start the engine indicates a faulty valve of incoming gas or low oil level in the engine.

5.TOOLS AND ACCESSORIES

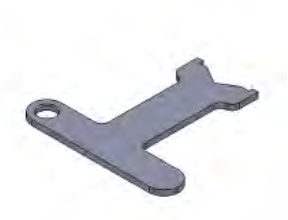


Figure 5.1

TOOL HOLDER KEY

The tool holder key (Fig. 5.1) is used for adjusting, mounting and dismounting of the tools. Always use the key for mounting. Item number is A03.00.00.00

Figure 5.2

FOAM PLATE

Diamond tools with Velcro are mounted on the foam plate (Fig.5.2). The foam plate is mounted on the "QuickChange System" . Item number is LV-13.5-FP-S

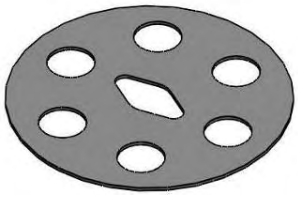


Figure 5.3

SECURITY PLATE FOR QUICKCHANGE PADS

Plate (Fig.5.3) used to ensure the "Quickchange" pads.
Item number is A38.00.02

6. POPULAR TOOLS

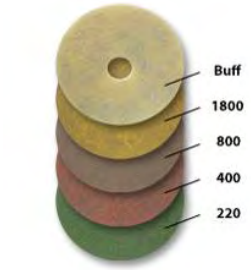
RECOMMENDED TOOLS

QuickChange System and Tooling feature extremely fast and convenient tool changes, and a long tool life, providing for great long-term cost savings. The QuickChange pads are produced in four different bonds for super hard, hard, medium and soft concrete, in a variety of grit sizes, with either 1 or 2 buttons, which allows you to customize the aggressiveness of the cut.

Calibra grinding discs: our popular ceramic bond discs are designed for the removal of difficult scratches and they save you valuable time by eliminating the need for multiple passes with metal tools. They can be used wet or dry, and are best for hard concrete applications. They are with Velcro attachment.

NATO® polishing discs feature a special resin formula designed for both wet and dry applications and a unique design with wide channels allowing for work on a cleaner surface and ensuring a quality polish. Available in 3 and 4 in sizes.They are with Velcro attachment.

V-HARR® Premium Polishing Pads are designed for mechanically polishing and restoring concrete; also ideal for terrazzo and hard stone floors. V-HARR® pads are offered in a wide variety of diameters and grit sizes to accommodate many applications. Dry use is strongly recommended.



Shine Pro® are high quality diamond-impregnated pads for floor maintenance. Available in a variety of sizes (17, 20, 21, 27 inch and other sizes), they are designed for use under swing machines and burnishers, and are great for daily use – they require only water (no wax or chemicals needed) and are a very environmentally friendly solution for maintaining floors.

Use only Superabrasive's recommended tools see www.superabrasive.com

7. EXPLODED VIEW

GENERAL EXPLODED VIEW (FIG.7.1)
TOOL HOLDER FOR MACHINES EXPLODED VIEW (FIG.7.2)
TOP COVER ASSEMBLY AND MOTOR SUPPORT EXPLODED VIEW (FIG.7.3)
PLANETARY DRIVE EXPLODED VIEW (FIG.7.4)

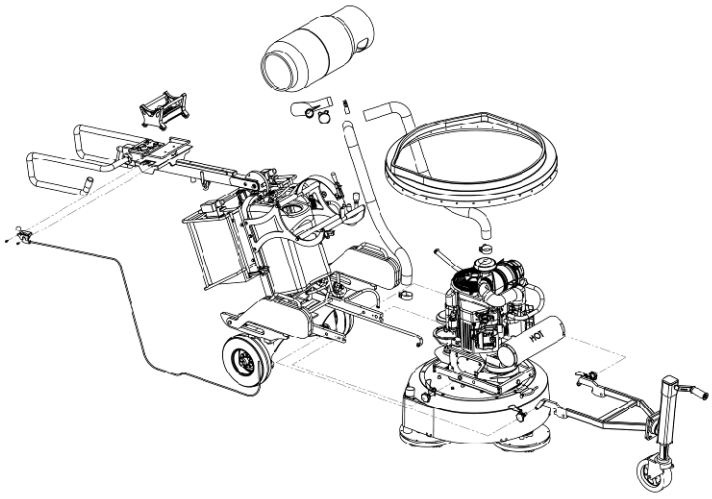


Figure 7.1

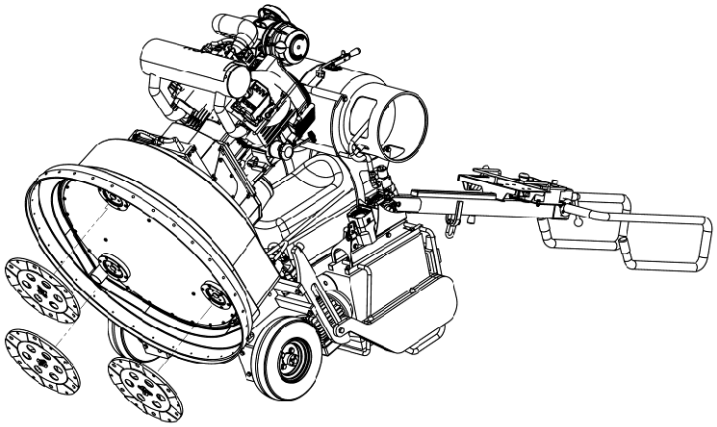


Figure 7.2

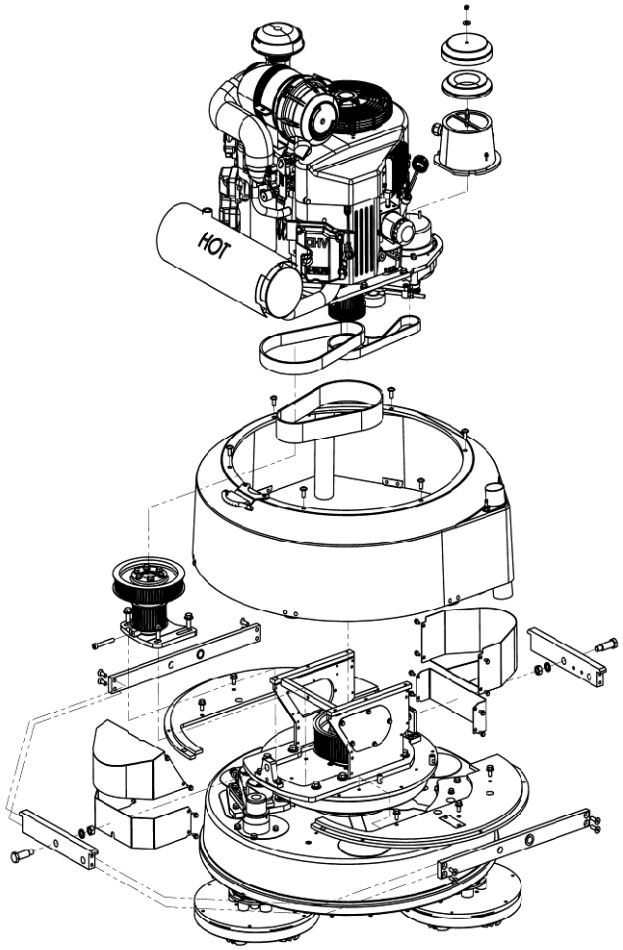


Figure 7.3

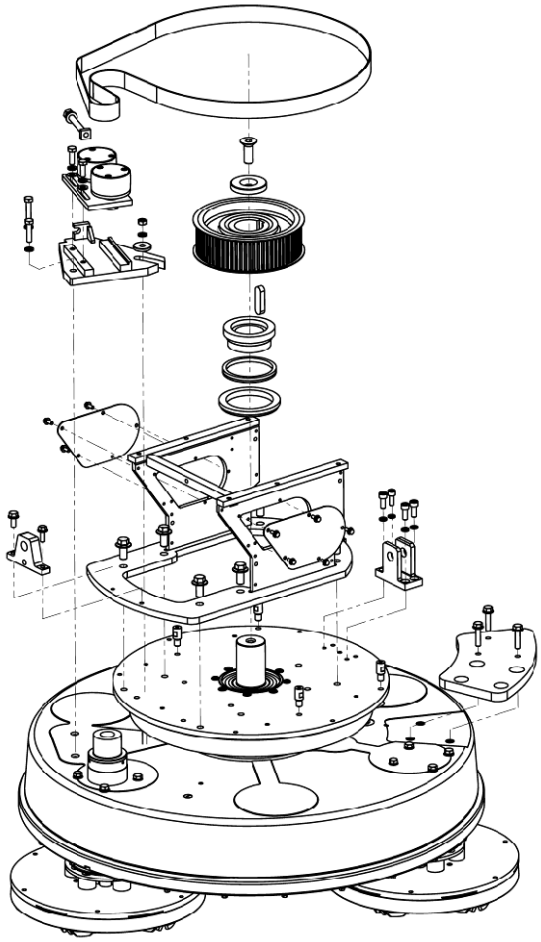


Figure 7.4

BOTTOM COVER ASSEMBLY EXPLODED VIEW (FIG.7.5)
TRANSMISSION BELT EXPLODED VIEW (FIG.7.6)
PULLEY UNIT EXPLODED VIEW (FIG.7.7)
CENTRAL SHAFT BEARING EXPLODED VIEW (FIG.7.8)

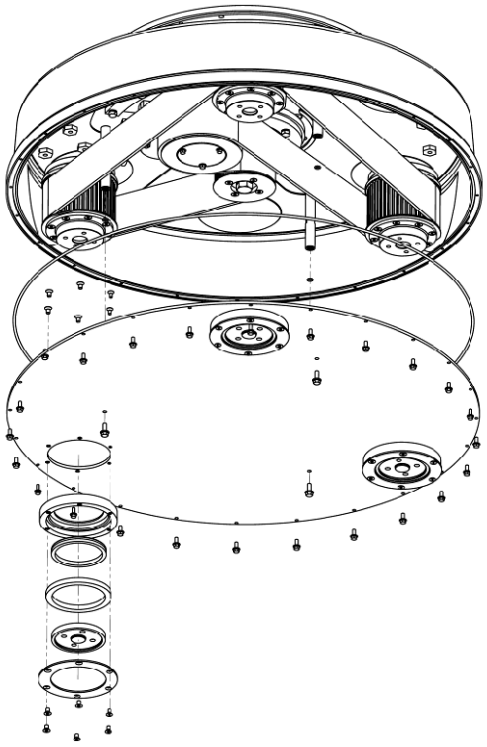


Figure 7.5

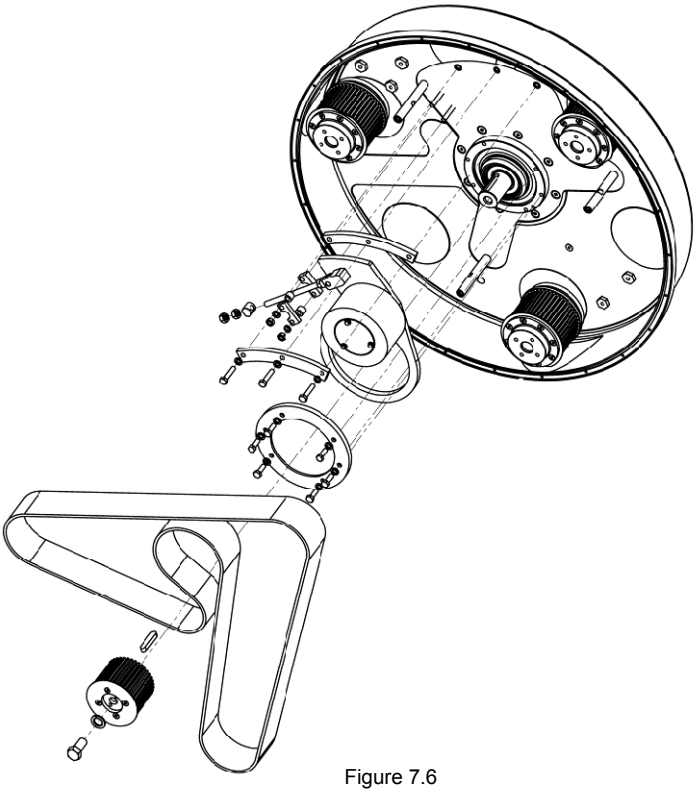


Figure 7.6

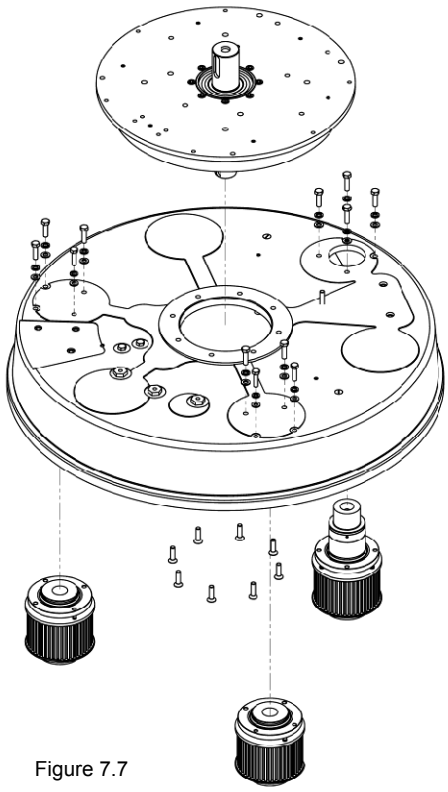


Figure 7.7

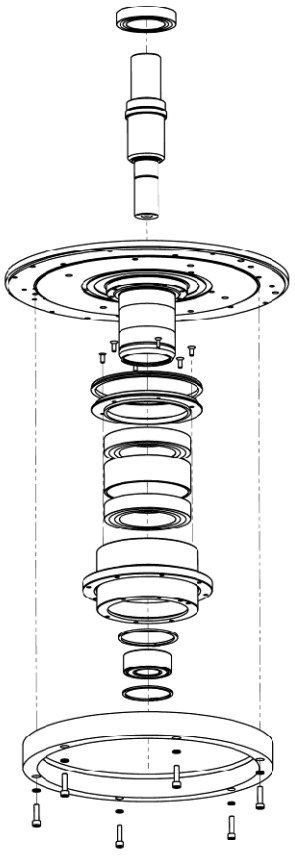


Figure 7.8

TOP COVER EXPLODED VIEW (FIG.7.9)
TOOL HOLDER EXPLODED VIEW (FIG.7.10)
CARRIAGE EXPLODED VIEW (FIG.7.11)
STEERING BRACKET EXPLODED VIEW (FIG.7.12)

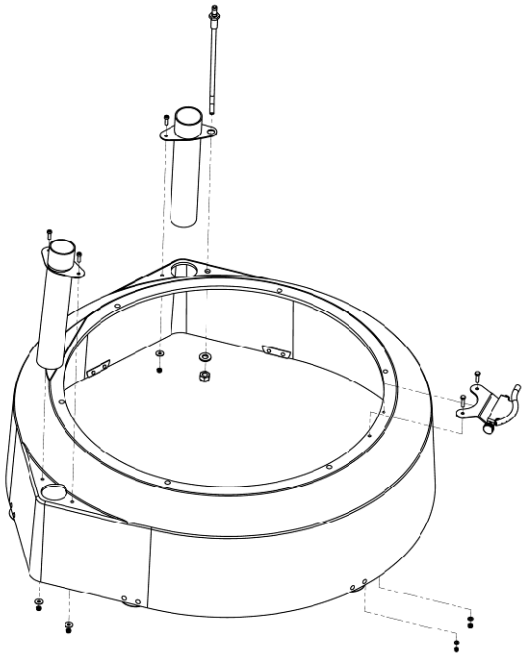


Figure 7.9

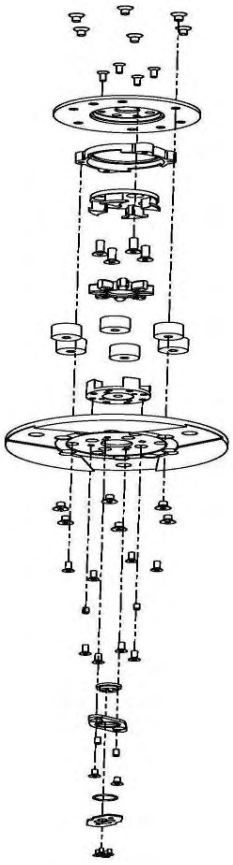


Figure 7.10

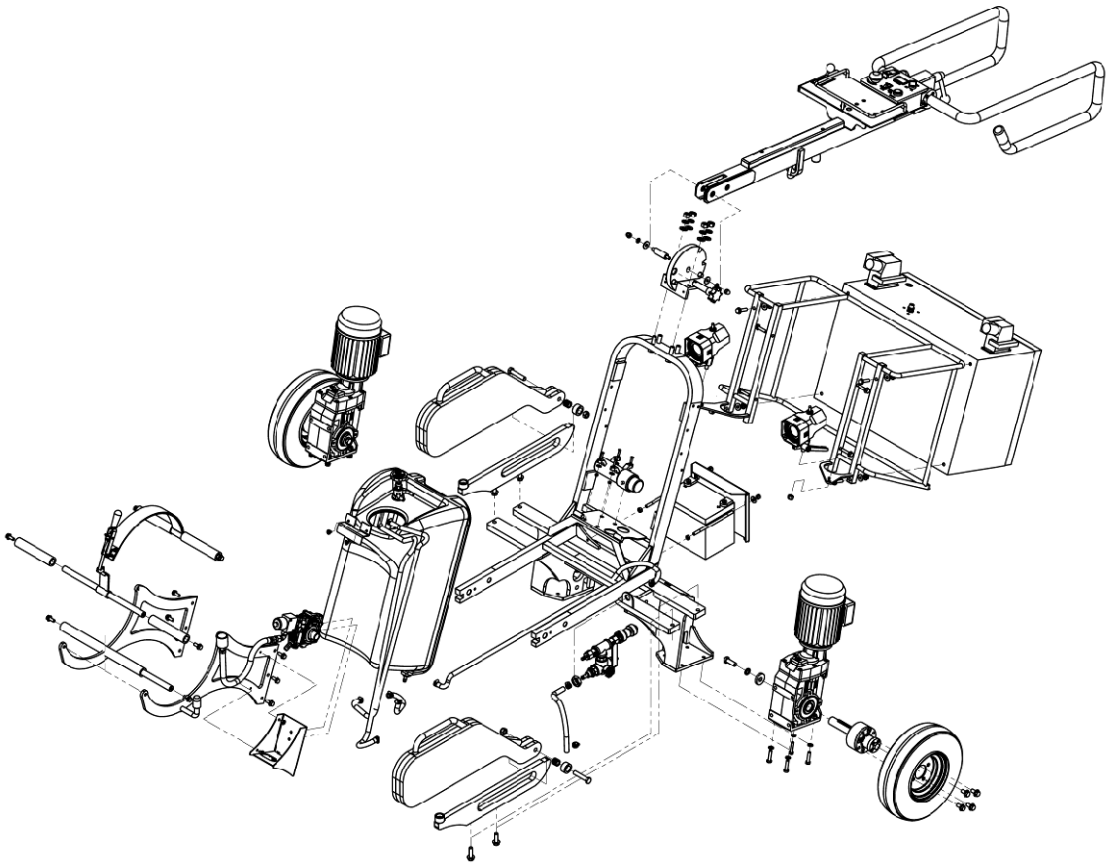


Figure 7.11

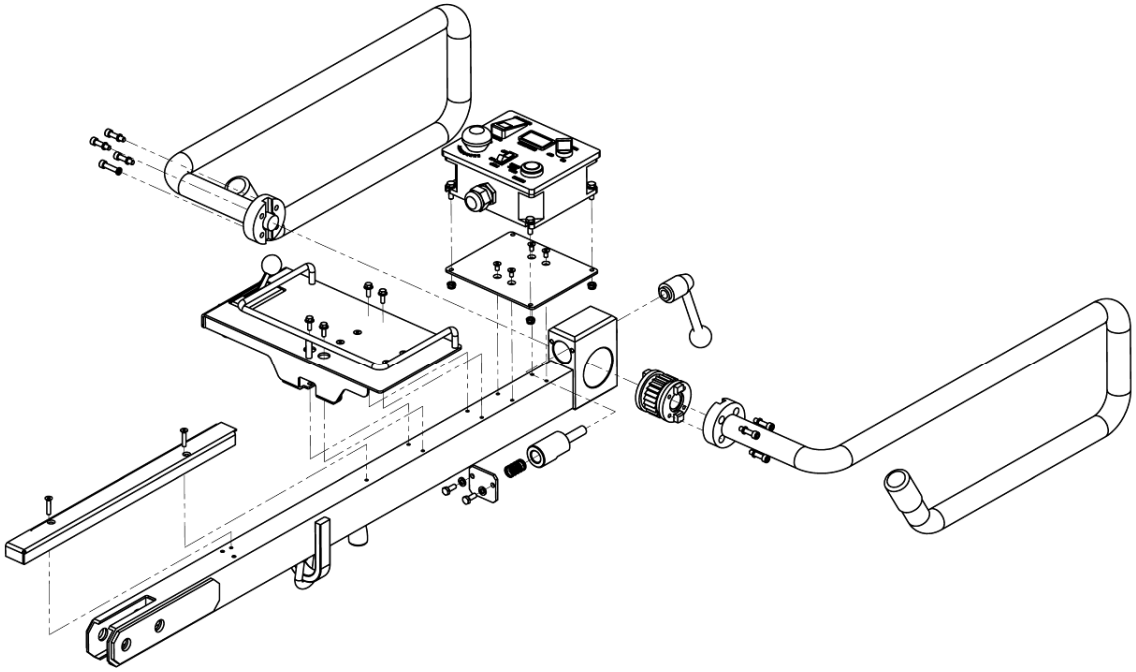


Figure 7.12

8. MAINTENANCE AND INSPECTION

REMARK

Tampering w/Emission Control System Prohibited

Federal law and California State law prohibits the following acts or the causing thereof: (1) the removal or rendering inoperative by any person other than far purposes of maintenance, repair, or replacement, of any device or element at design incorporated into any new engine for the purpose of emission control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the engine after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering, involve the parts/systems listed below:

- Carburetor and internal parts
- Spark plugs
- Magneto or electronic ignition system
- Fuel filter element
- Air cleaner elements
- Crankcase
- Cylinder heads
- Breather chamber and internal parts
- Intake pipe and tube

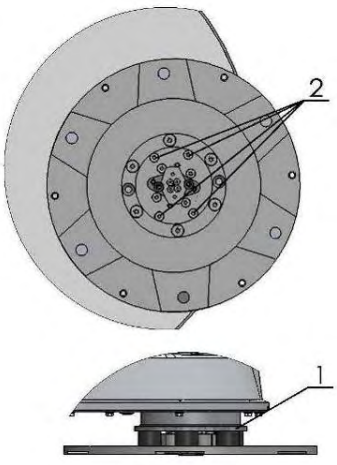


Figure 8.1

CLEANING

Keep your machine clean. Cleaning the machine on a regular basis will help detect and solve potential problems before they cause damage to the machine. Most importantly, check and clean the tool plate connections, power cord and plugs, vacuum hoses, water tank and the Propane installation.

CHECK DAILY

After operating the Lavina® 38GR-S, the operator should conduct a visual inspection of the machine. Any defect should be solved immediately. Pay attention to plugs and vacuum hoses loose bolt or screws.

Tool holders: Buffers and spiders are consumables and must be visually checked daily and replaced if needed. The key lock holders (butterflies) on the tool holders should be also checked.

Check the rubber buffers and fixing of the holders. The flange holding the buffers (Fig.8.1-1)has to be firmly fixed to the unit. A gap seen there means that there are loose screws fixing the holder. The screws has to be tightened immediately for safety operation.Working with loose screws on the holder could also cause bad damages on the machine. Tightening force of the screws has to be 25...30N.m(18...22 ft/lbs).

It is very important to check regularly the screws(Fig.8.1 2),that fix the "Quickchange" holder to the safety part, so that holder will not fly away if the buffers got damaged.

"Quickchange" should be clean. The tension of the planetary belt can be daily checked by moving the main head and feeling the resistance of the moving pulleys, if the belt slips tighten if necessary, as described in the chapter Troubleshooting .

CHECK AND REPLACE AFTER THE FIRST 8 WORKING HOURS

Replace the oil in the engine after the first 8 hours work, according to the instructions of the engine manufacturer.
ALWAYS USE 30HD OR 10W30 ENGINE OIL WITH ALL OF THE FOLLOWING RATINGS: SF, SG, AND CC

CHECK AND REPLACE EVERY 50 WORKING HOURS

Change engine oil, while changing check for leakage of engine oil at the various seals. The hour meter will blink between 48-52 hours as a reminder/"Engine Oil Capacity" is 1.5L(1.6US.qt) when oil filter is not removed ;1.7L(1.8US.qt) when oil filter is removed/.

Recommended Oil Change Intervals

Do not exceed the 50-hour oil change interval. Oil changes more frequent than 25 hours will give even longer engine life. In any case, always use 30HD or 10W30 engine oil with all of the following ratings: SF, SG, and CC. make sure the oil level is maintained at the "FULL" level.

CHECK EVERY 200 WORKING HOURS

Every 200 working hours, the operator should inspect all parts of the machine carefully. Most importantly, inspect and clean the tool plate connections, plugs, vacuum hoses and water tank and filter. Also, check the water flow of the pump. Check the guard assembly. Make certain the wheels are clean and rotate properly. Inspect the control buttons. If there are defective control parts, they should be replaced immediately. Replace worn vacuum- and water hoses.
Carefully inspect the seal rings and bearings of the grinding units, and replace any showing signs of excessive wear.
For more information, refer to chapter troubleshooting below. Open the top cover on the motor base to check of the planetary driving belt, by moving the main head the belt should not slip on the planetary pulley and drive the pulleys.
Return machine to **authorized service center** for overall checkup of the Engine. For Propane safety, have the machine serviced by a **Certified Technician**, including emission check.

CHECK EVERY 400 WORKING HOURS

Besides the checks of 200 working hours.

Remove the protective covers under the motor. Check the belt that moves the generator. If necessary tighten it making sure not to "over tension", never tighten it to the first given values. Replace it if necessary.

Return machine to authorized service center for overall checkup of the Engine. For Propane safety, have the machine serviced by a Certified Technician, including emission check.

Return machine to authorized service center for overall checkup of the Engine. For Propane safety, have the machine serviced by a Certified Technician, including emission check.

CHECK EVERY 1000 WORKING HOURS

Besides the checks of 400 working hours.
Dismount the tool holders and bottom cover assembly (See Troubleshooting). Check if the transmission belt and motor support belts tension are in good condition, and change if needed.

VACUUM

As stated previously, frequently check hoses and other parts for clogging.

WATER LEAKS

Replace any leaking parts immediately as the water could damage your machine

ELECTRICAL SYSTEM

Dust should not enter the control box, as it will destroy the contacts. Remove (blow out) any dust present.

MECHANICAL PARTS

Parts such as the belt, seal rings, cap rings, spiders and buffers and guard assembly are subject to wear and should be replaced as needed.

CARRIAGE WHEELS
Check the pressure of the pneumatic tires and maintain it at the limits of 3.5-4 atm/50...60PSI/.

BATTERY OF THE DRIVING
The machine uses maintenance free battery. The battery charges automatically during work.

Self propelled movement of the machine is made only when the engine is started.
Violation of this requirement may lead to the destruction of the battery.

The approximate battery charge level can be checked on the Indicator Lights (Fig.8.3) that is noted in the operating manual of the control box built-in DC-to-AC Inverter/Chargers.
Upon long outage of the machine (more than one week) it is recommended to switch off the battery of the system by the safety switch on the bottom part of the board (Fig.8.2) or to unplug the battery cables.

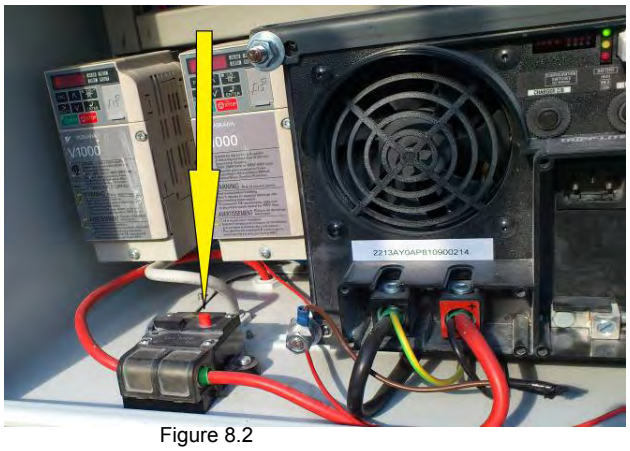


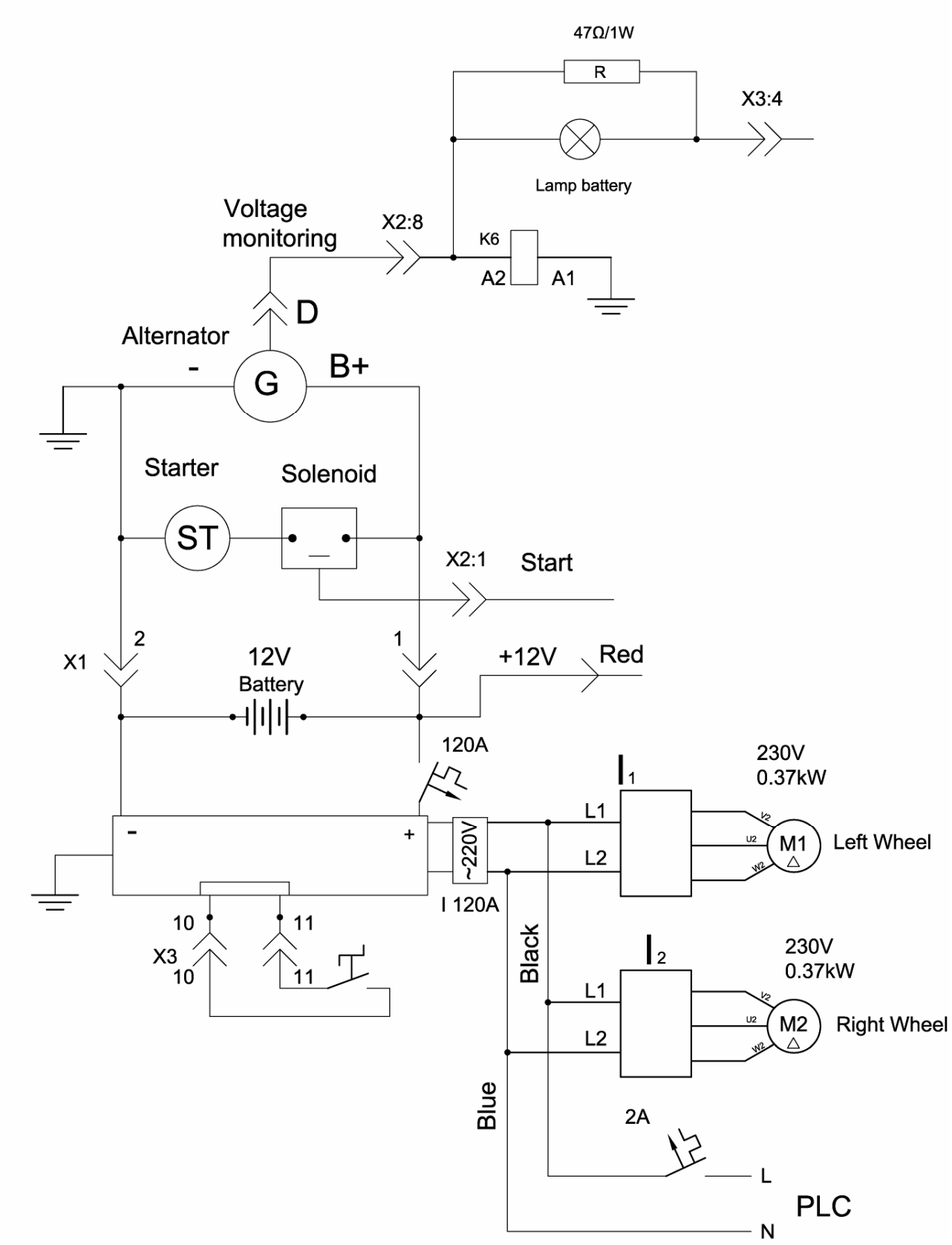
Figure 8.2

Figure 8.3

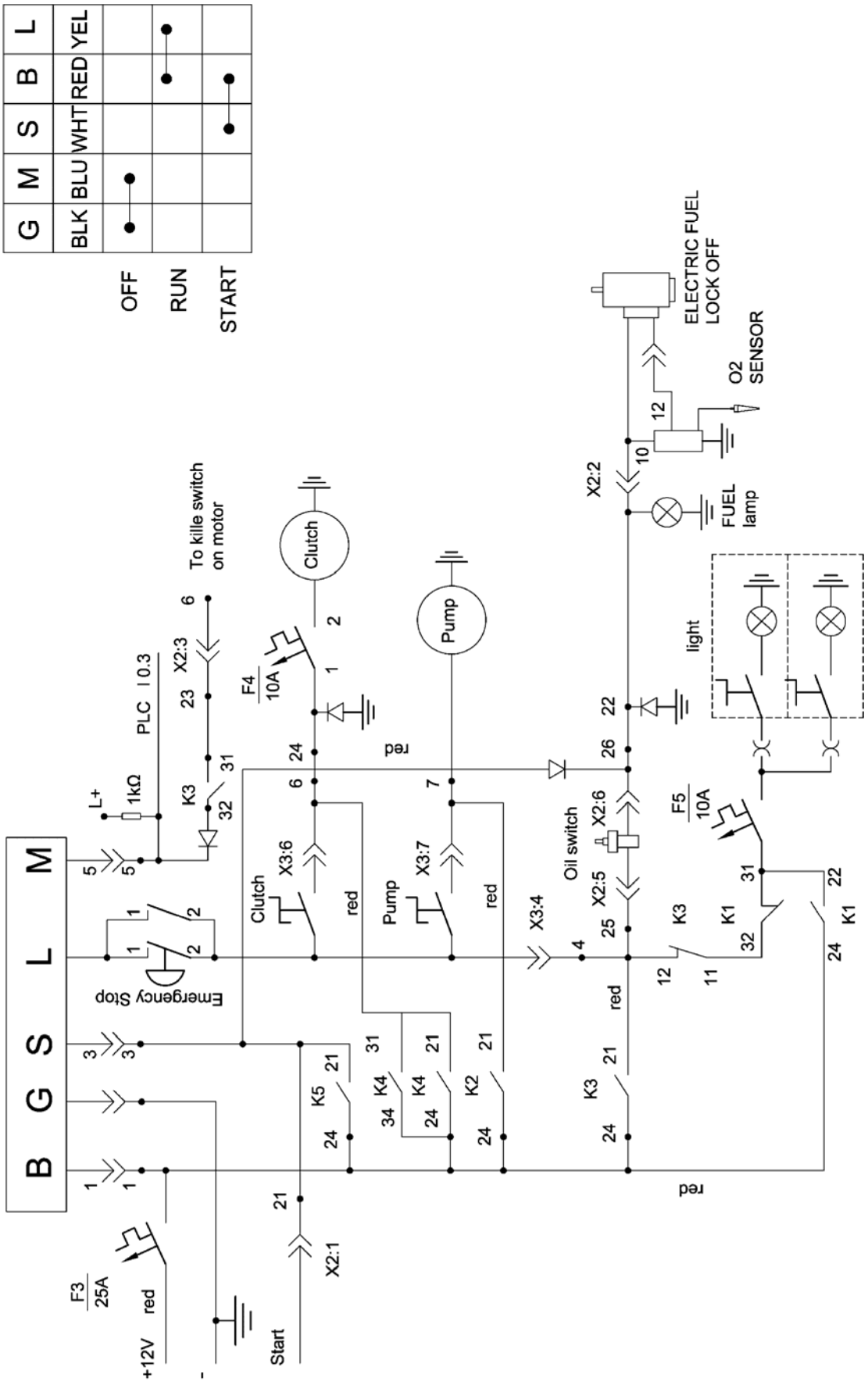
BATERRY OF THE PANEL
The condition of the panel battery is displayed on the right upper corner of the screen. In case the batteries are run down they should be changed or the panel to be connected with the cable (see.Fig.4.8; Fig.4.9; Fig.4.10), then the baterries start to recharge.

LAVINA®38GR-S ELECTRICAL SYSTEM

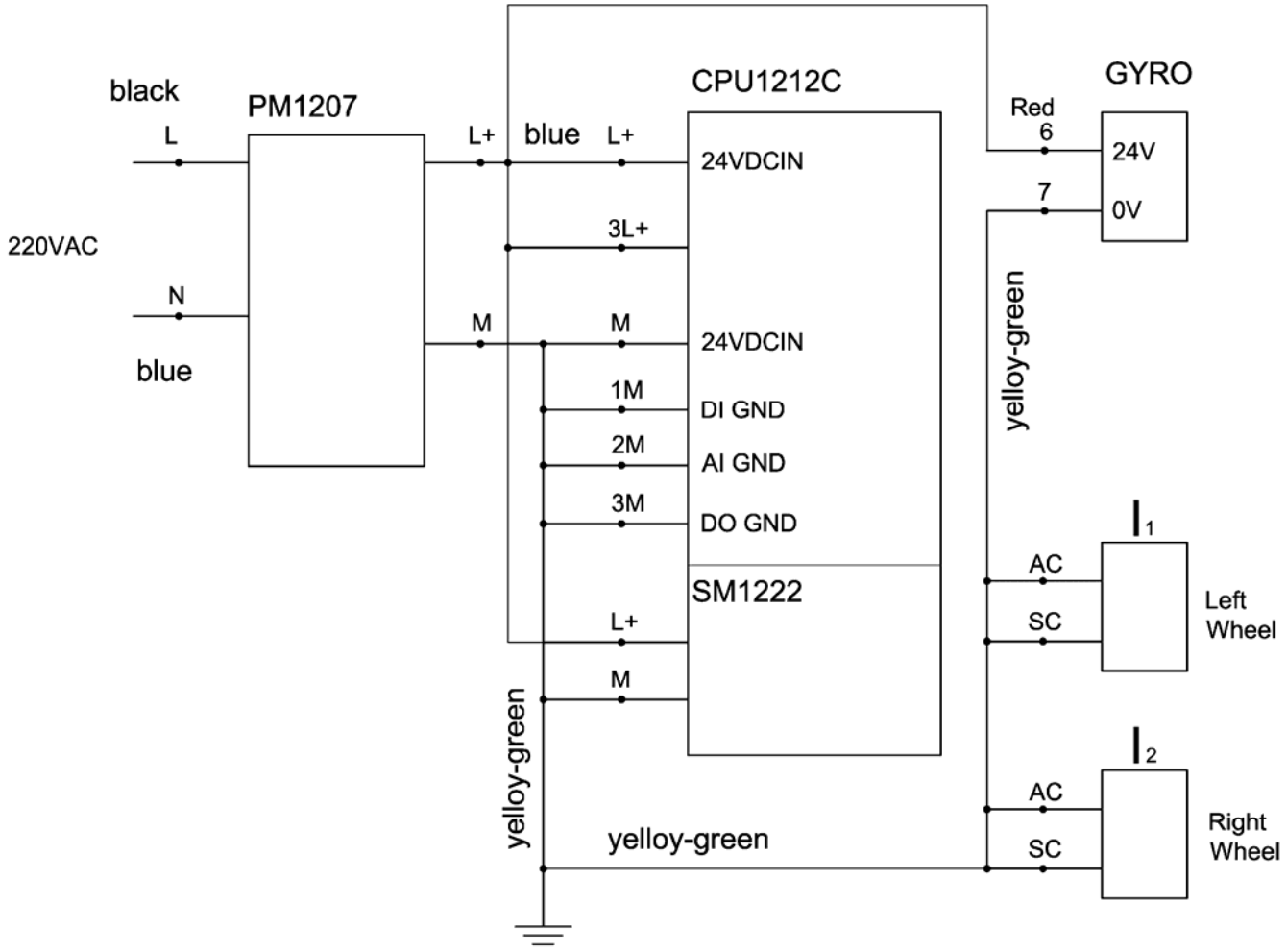
Main Circuit



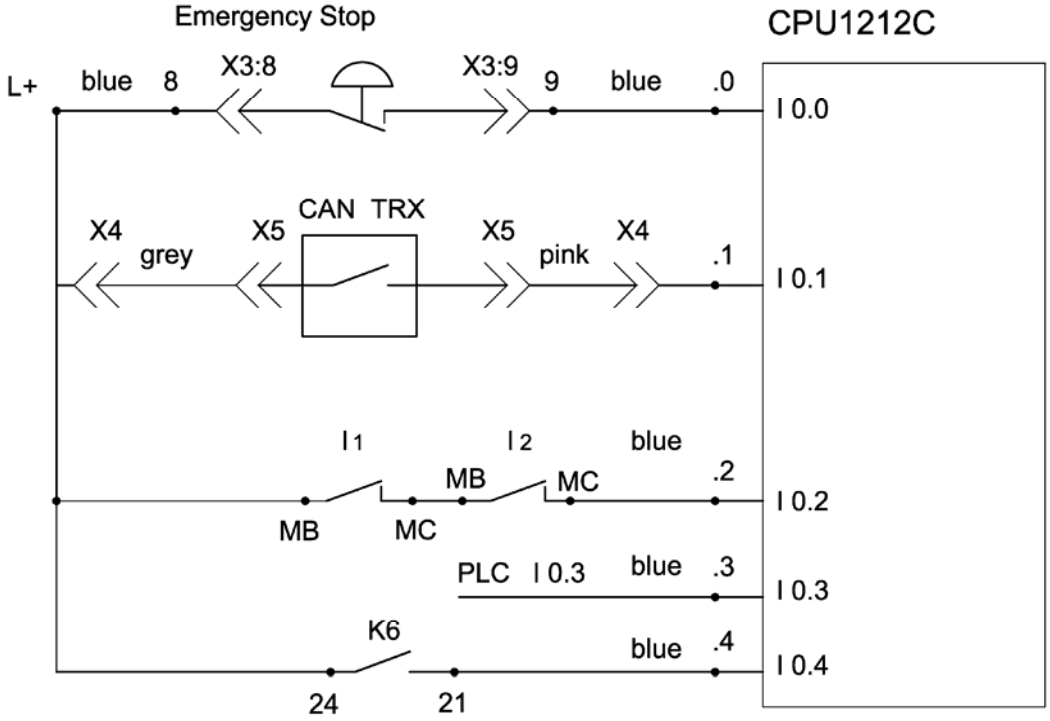
Control Circuit



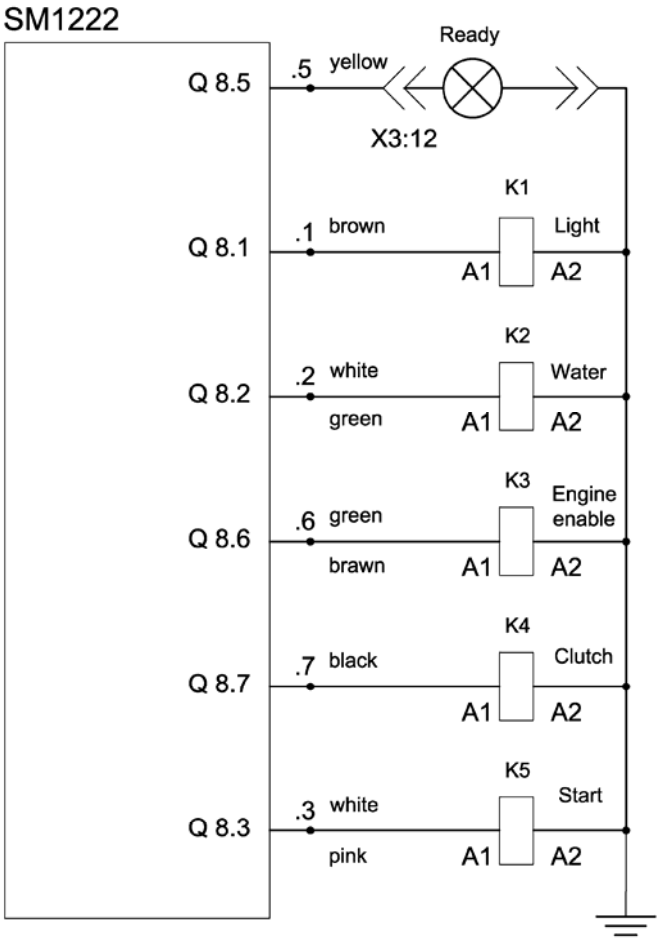
Power Supply



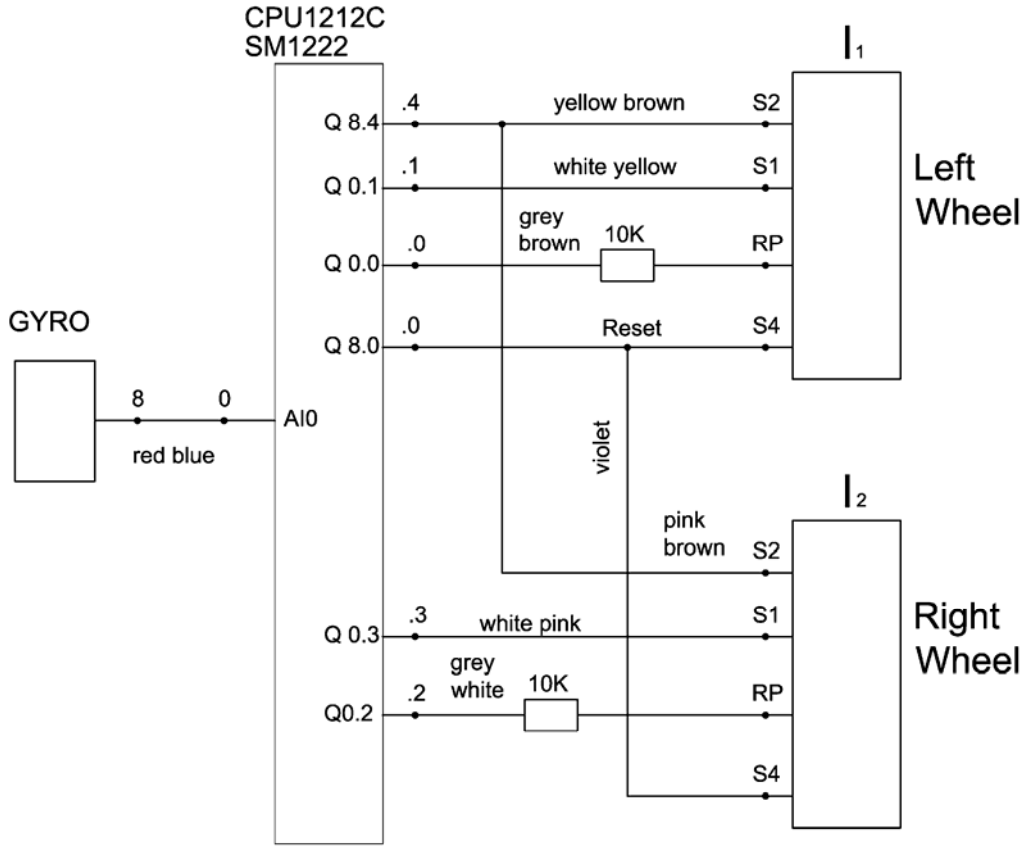
Digital Inputs



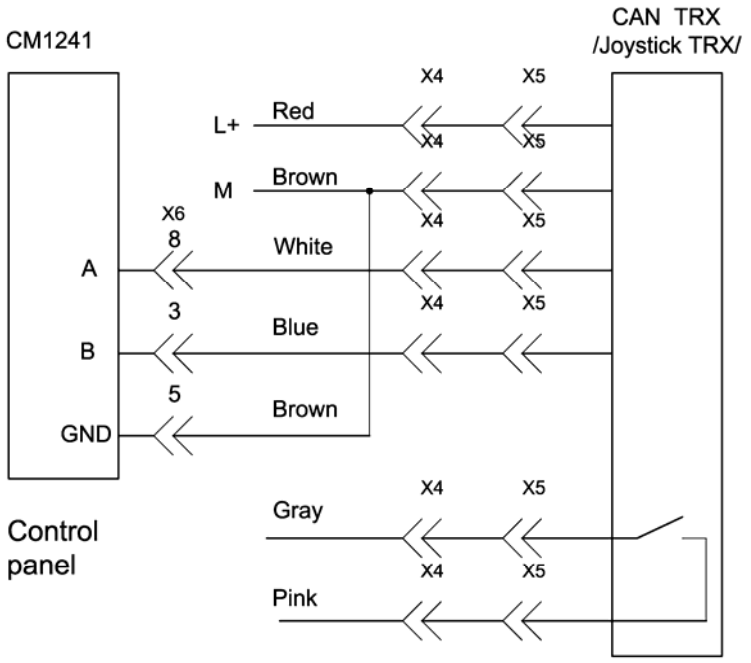
Digital Outputs



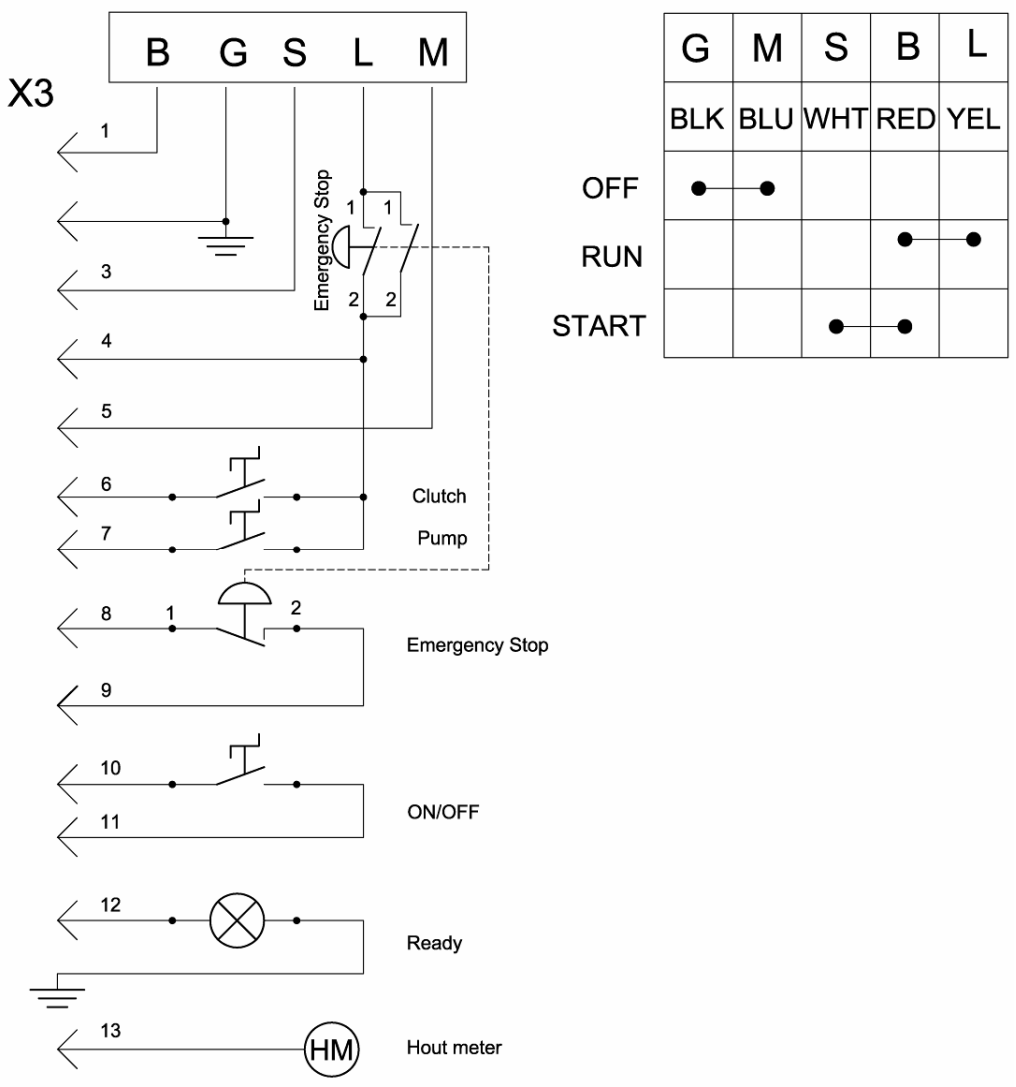
Motion Control



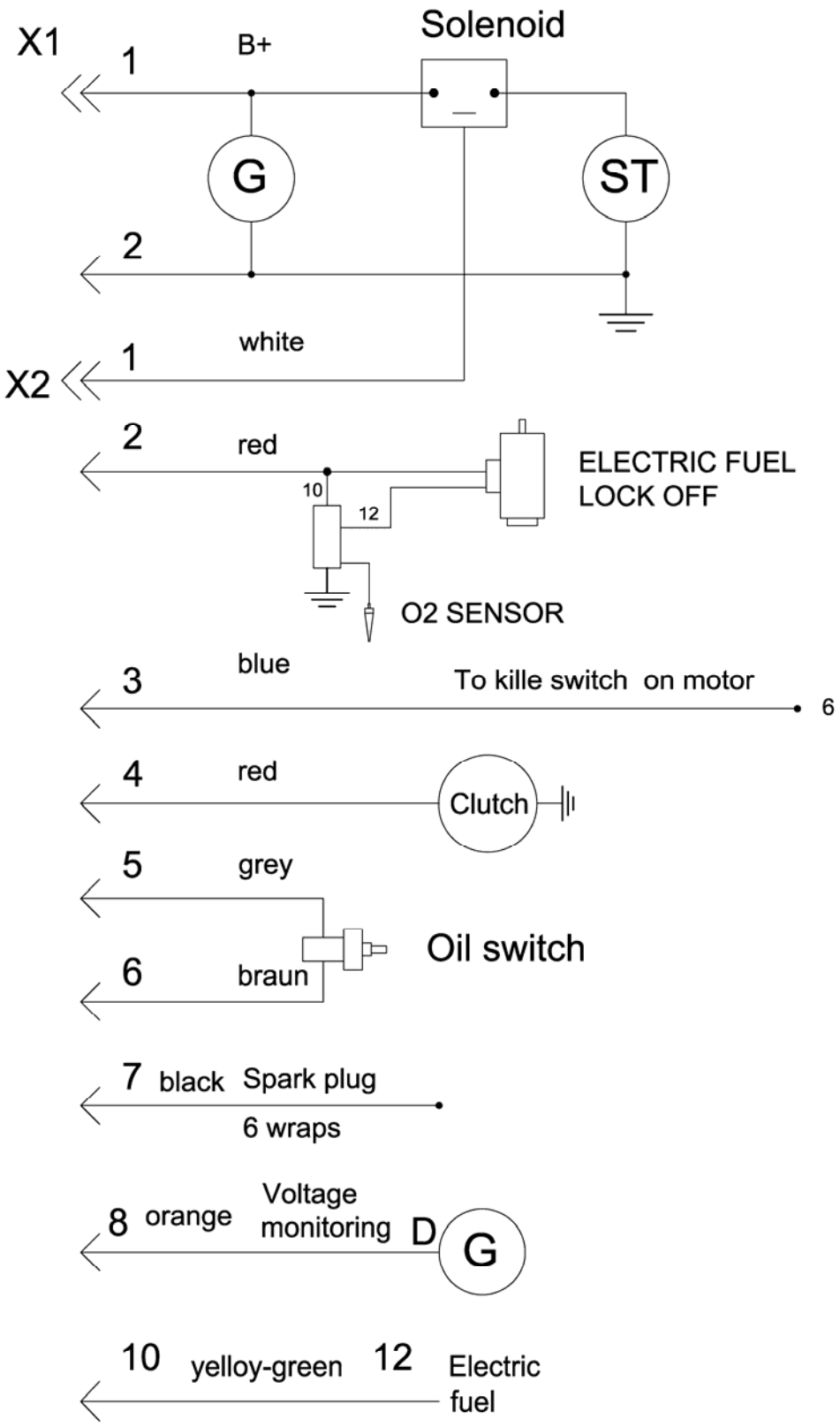
Comunication



Control panel



Grinding Head



9. TROUBLESHOOTING

INDEX OF PROBLEMS AND SOLUTIONS

9.1 ENGINE

When troubles occur, be sure to check the simple causes which at first, may seem too obvious to be considered. For example, a starting problem could be caused by fuel starvation due to an empty propane cylinder or an unopened service valve. If you do not check for this, starter burnout could result.

Some Troubles and solutions:

Surging idle

To smooth out the engines' idle characteristics, adjustment is provided by an idle screw on the lower left side of the carburetor as viewed from the operator's position. The screw is bright steel and 1/4" in diameter with a Phillips head on it. Rotating the screw clockwise will increase the idle speed and this should cure the "surging idle". If it does not, call our customer service.

Engine starts and idles, but will quit as the throttle is advanced

It is possible that the propane tank's service valve is faulty. To check for this, close the valve completely and then reopen very slowly while you listen for a "click" when the gas begins to travel through the valve. If you hear this very slight noise, the valve is only partially opening. This allows enough gas through to start and idle the engine, but not enough for full throttle operation. As the throttle is increased, allowing more air to enter the intake, the engine will quit from fuel starvation. Call your dealer or the factory for instructions on where to have the service valve replaced. Meanwhile, to get by, you can continue to open the service valve until you do not hear a "click" and then the engine will run normally. If it does not, call your customer service.

Starter barely turns the engine over or the solenoid just clicks

The battery is likely low in charge. This can be remedied by recharging the battery using a 12 Volt battery charger at 4.12 amperes. The battery is under the control box. The positive post is the one with the RED cable attached to it. Follow the instructions that came with the battery charger. REMINDER: this will continue to happen unless your engine is run for sufficient time between starts to recharge the battery.

9.2 CHECKING AND CHANGING OIL

Figure 9.2.1

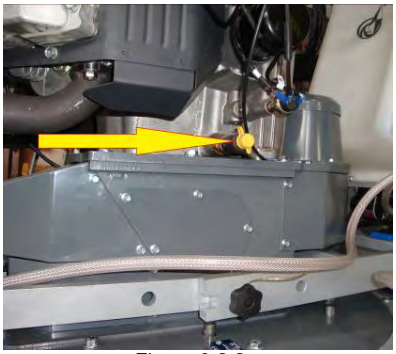


Figure 9.2.2

Check the engine oil level, screw the dipstick in to get reading. While changing engine oil, check for leakage of engine oil at the various seals. The hour meter will blink between 48-52 hours as a reminder.

Recommended Oil Change Intervals

Do not exceed the 50-hour oil change interval. Oil changes more frequent than 25 hours will give even longer engine life. In any case, always use 30HD or 10W30 engine oil with all of the following ratings: SF, SG, and CC. make sure the oil level is maintained at the "FULL" level.

9.3 SEPARATING THE HEAD FROM THE CARRIAGE

Please note that the propane cylinder has to be removed (Fig. 9.3.1) and stored outside before any maintenance or reparation is done.

Figure 9.3.1

Figure 9.3.2

Figure 9.3.3

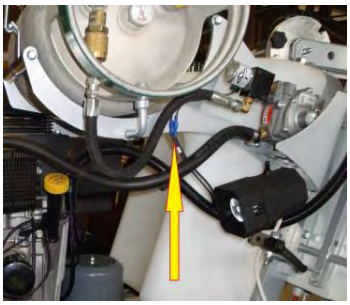


Figure 9.3.4

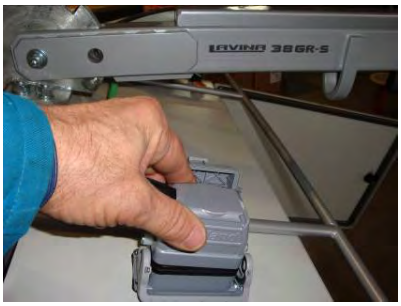


Figure 9.3.5

Figure 9.3.6

Pull the connector of the battery (Fig. 9.3.2), pull out the propane hose (Fig. 9.3.3), the connectors of the LP Fuel Lockoff valve (Fig. 9.3.3), unplug the engine cable plug from the control box (Fig. 9.3.5) and dismount the Throttle Cable (Fig. 9.3.4). Disconnect the water and vacum hose from the main head by pulling it out (Fig. 9.3.7) (Fig. 9.3.8). Release the pin sets (Fig. 9.3.9) and dismantle the third wheel. Release the pin sets which attach the head to the carriage and divide the carriage from the main head (Fig. 9.3.10).

Figure 9.3.7

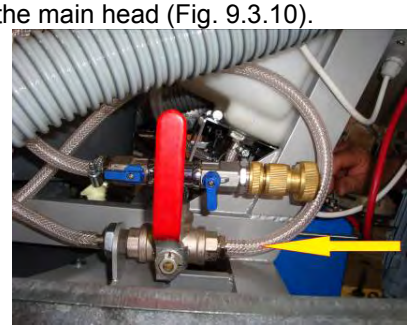


Figure 9.3.8

Figure 9.3.9

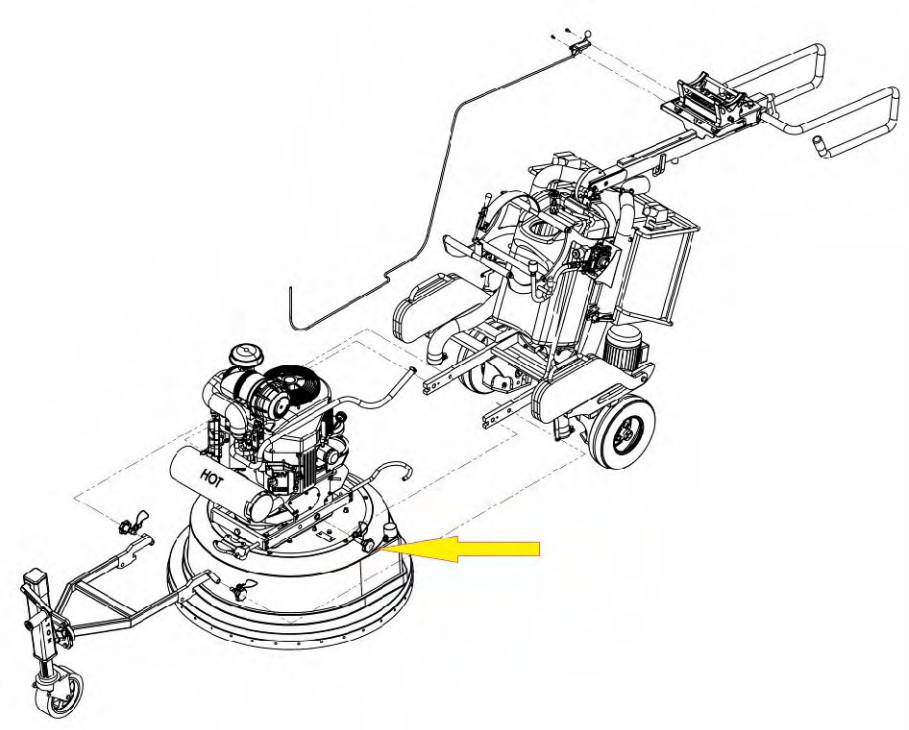


Figure 9.3.10

9.4 DISMOUNTING/MOUNTING THE ENGINE

Separate head from carriage (see previous chapter). Remove front and back belt protection (Fig. 9.4.1). Loose the motor base plate (Fig. 9.4.2), release the tension device (Fig. 9.4.3), and take out the belt (Fig. 9.4.4). Take off the engine (Fig. 9.4.4).

Figure 9.4.1

Figure 9.4.2

Figure 9.4.3

Figure 9.4.4

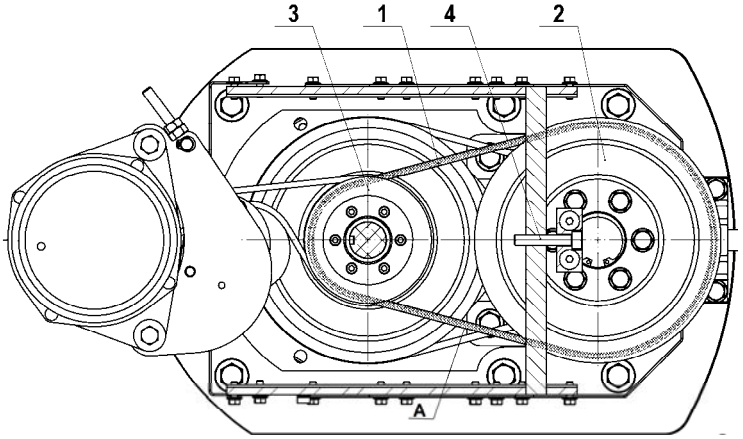


Figure 9.4.5

Reassemble in the same manner. (Fig. 9.4.5), Tension the belt with bolt (4) on (fig. 9.4.5). The belt tension can be tested with a Frequency tension Tester Optibelt 3 TT or manual by pushing with a force of 8 kg or 17.6 lbs in point "A", the deflection of the belt must be 3,44 mm or ± 0.135 Inch.

ATTENTION:

NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DESTROYED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION

9.5 REPLACING THE CLUTCH

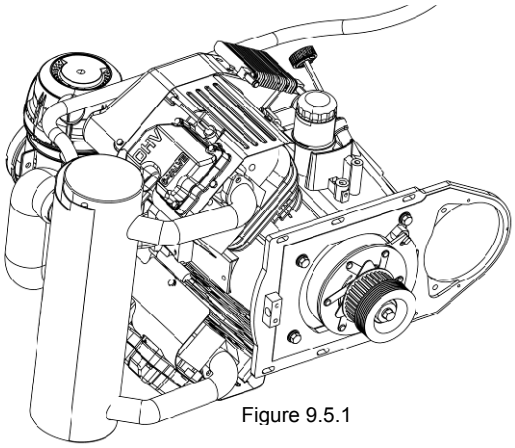


Figure 9.5.1

Incase the electric clutch has to be replaced, remove the engine (see previous chapter) and lay it on its side with the oil drainage up (Fig. 9.5.1). Remove the motor base plate and loose the front nut with an impact wrench to dismount the pulley and clutch (Fig. 9.5.2).

Reassemble in the same manner. Do not forget to mount back the washer on the shaft (Fig. 9.5.3). The torque on the front nut (Fig. 9.5.2) to mount the pulley and clutch should be 68÷75 Nm or 50÷55 ft lbs.

Figure 9.5.2

Figure 9.5.3

9.6 DISMOUNTING AND MOUNTING TOOL HOLDERS TO CHANGE BUFFERS AND SPIDERS, CHANGING V-RINGS AND FELT-RINGS

Figure 9.6.1

Figure 9.6.2

Figure 9.6.3

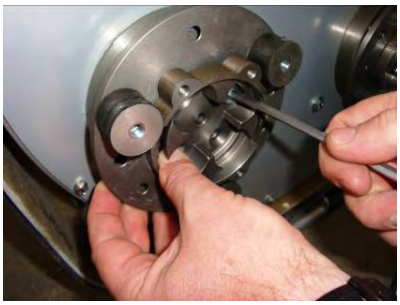


Figure 9.6.4

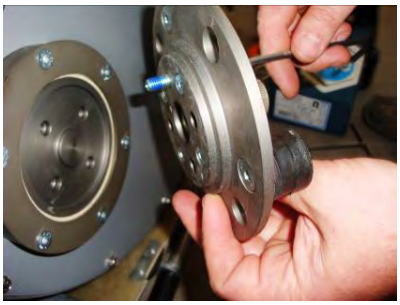


Figure 9.6.5

Figure 9.6.6

To check or replace the buffers and the spiders, the tool holders have to be dismounted. Remove the countersunk screws on top of the buffer (Fig.9.6.1). Take the disc off (Fig.9.6.2), the spider can be removed or replaced (Fig.9.6.3). By loosing four Hex cap bolts (Fig.9.6.4), the disc comes loose (Fig.9.6.5) and the buffers can be replaced (Fig.9.6.6). Attention, by mounting use always the "blue" thread locking adhesive, except on the bolts to lock the buffers (Fig.9.6.5). Use always original bolts.
Depending on the number (3,4 or 6) of buffers, the holder can be more flexible or rigid.

Figure 9.6.7

Figure 9.6.8

Figure 9.6.9

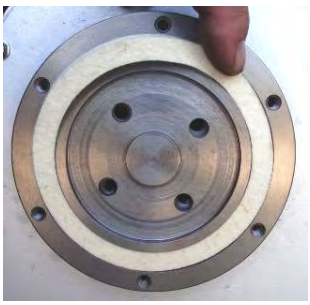


Figure 9.6.10

When the tool holder is dismounted, you can change the sealers (V-Ring and Felt-Ring). Take out Felt-Ring, Adaptor and V-Ring. Before mounting check on which side the adaptor is fitting, remember the correct side. Mount the V-Ring with the smallest lip of the V to inside (Fig.9.6.7) just push the V-ring so the top is on the same level as the pulley top (Fig.9.6.8). Than take the adaptor in the correct way and push the V-Ring down with the adaptor (Fig.9.6.9). The lowest lip of the V-Ring should only barely touch its gliding surface; also never push the V-Ring down with fingers. Mount now the Felt-ring on top (Fig.9.6.10). Close the sealers with the cap (Fig.9.6.11).

Figure 9.6.11

9.7 TENSIONING USED PLANETARY BELT

Take the main head of the carriage, like described in the paragraph "Splitting the carriage from the main head", Dismount the top cover.

Noticing speed lost in planetary movement it is possible to tension the belt for planetary movement as described in 9.8 Mounting and tensioning a new planetary belt.

Figure 9.7.1

Figure 9.7.2

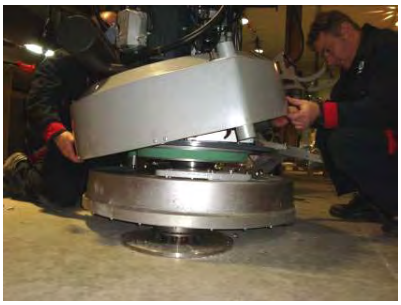


Figure 9.7.3

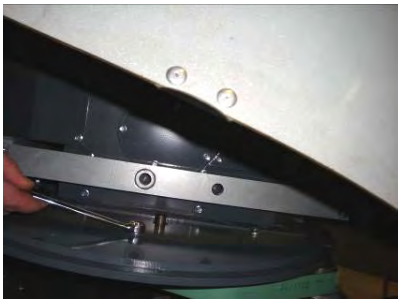


Figure 9.7.4

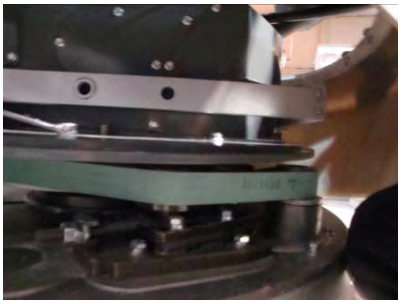


Figure 9.7.5

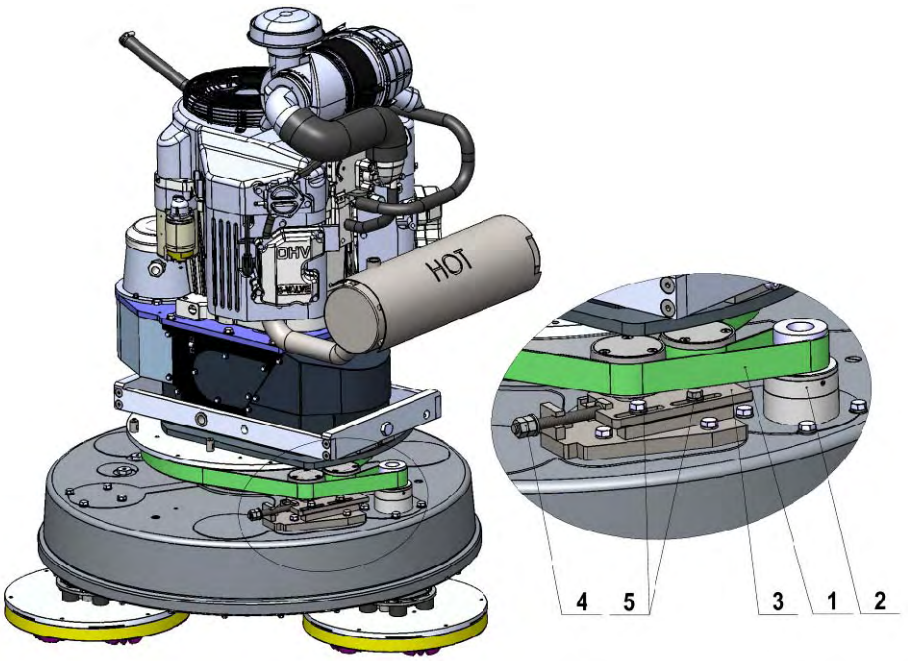


Figure 9.7.6

9.8 MOUNTING AND TENSIONING A NEW PLANETARY BELT

Figure 9.8.1

Figure 9.8.2

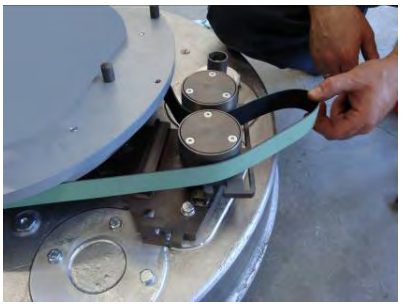


Figure 9.8.3

Figure 9.8.4

Figure 9.8.5

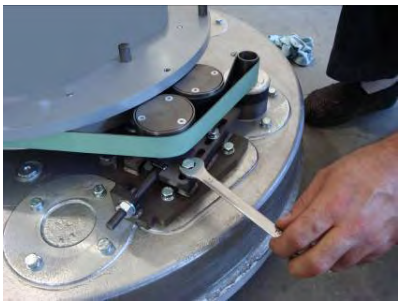


Figure 9.8.6

Figure 9.8.7

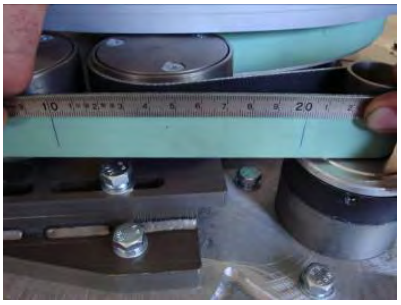


Figure 9.8.8

Dismount completely the tensioning device.
Make 2 signs on the dismounted belt exactly 10 cm out of each other (belt without tension) (Fig.9.8.1). The purpose is to measure 10.2 cm on the belt in tension what is a tension of 2%., a maximum of 2.5% is allowed. **ATTENTION: NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DAMAGED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION**
Mount the belt back around the planetary pulley; see that the belt is behind the driving pulley (Fig.9.8.2). Put the belt around the left roller of the tensioning device (Fig.9.8.3). Put the tensioning device back in place and pull the belt from the roller on the right side (Fig.9.8.4). Put the belt around the driving pulley (Fig.9.8.5). Loose slightly the two bolts of the tensioning device (Fig.9.8.6) (Fig.9.8.7).Begin to tension until the measure of 10 cm between the marks becomes 10.2 cm (Fig.9.8.8). Tighten the tensioning device while turning the bolt move the planetary head so the belt can slide. Do not forget to lock the tensioning device.

9.9 TENSIONING AND REPLACING THE MOTOR SUPPORT BELTS

Follow the steps described in 9.4 (dismounting/mounting the engine). Pull out the engine together with the carrier plate, and the upper timing belt (6) (Fig.9.9.1), the generator and its driving belt (stays tighten) (Fig.9.9.2). Loosen the bolts (2)(Fig.9.9.3), unscrew and take out the bolts (1) (Fig.9.9.3). Unscrew (5) in order to pull the tensioner backward, take out the lower timing belt (2) (Fig.9.9.1).

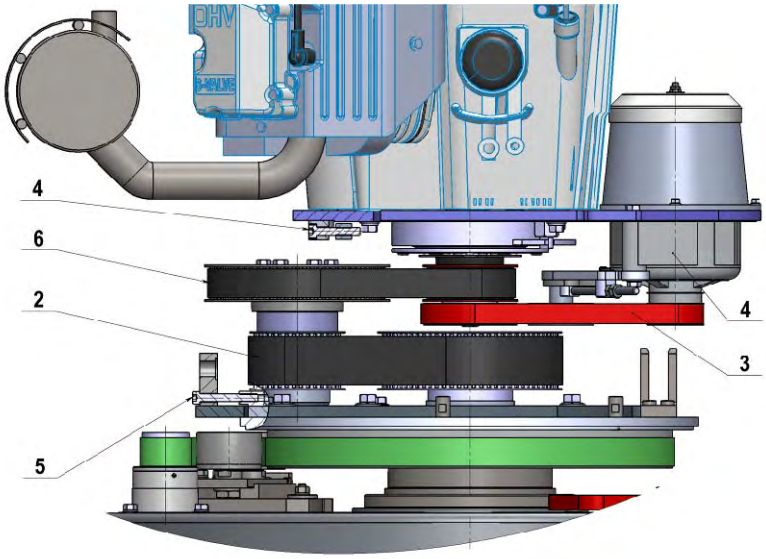


Figure 9.9.1

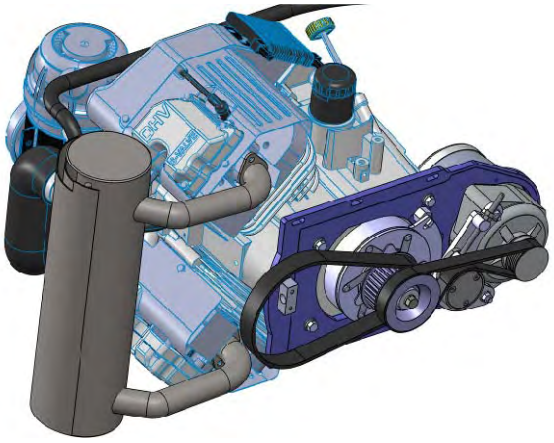


Figure 9.9.2

The mounting and tighting the belts is made on the reverse sequence.

- First mount the lower timing belt (2) (Fig.9.9.1). Pull the tensioner forward to screw the two bolts (1) (Fig.9.9.3) and one screw (5) (Fig.9.9.1). Fasten lightly bolts (1)and(2)(Fig.9.9.3) and tighten the belt screwing the screw (5)(Fig.9.9.1) or (Fig.9.9.4).

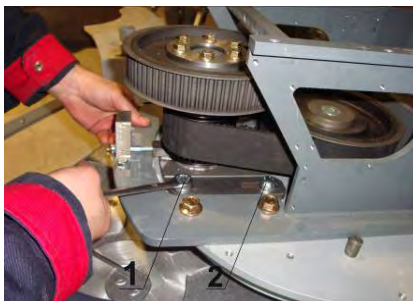


Figure 9.9.3

Figure 9.9.4

Figure 9.9.4

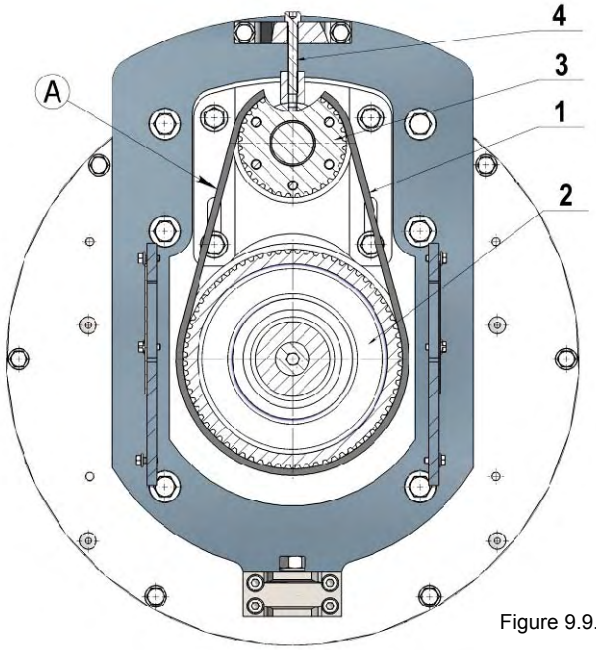


Figure 9.9.5

The belt tension can be tested with a Frequency tension Tester Optibelt 3 TT (Fig.9.9.4) or manual by pushing with a force of 16 kg or 35.3 lbs in point A , the deflection of the belt must be 3.44 mm or ±0,135Inch (Fig.9.9.5). It is recommended that the tensioning of the belt be measured with a Frequency tension Tester Optibelt 3 TT . The tension of the belt must be (220÷230) 1/s. When the tightening is done screw the bolts (1)and(2) (Fig.9.9.3) and check again the tension.

ATTENTION:

NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DESTROYED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION

- Driving belt of the generator

The belt can be mounted and tighten both on mounted or dismounted engine. When you do it with the mounted engine use also the side holes for better visibility.

In case you make the change when the engine is removed obligatory make sure the upper timing belt (6)(Fig.9.9.1) is on its place before mounting the belt of the generator.

While tensioning check regularly tension. Push the belt down in point A and with a pressure of 45N (Fig. 9.9.6). This is approximately 4.5 kilograms or 10 pounds, with this pressure the belt should move 6.9÷7.8 mm or 0.27÷0.30inch. It is recommended that the tensioning of the belt be measured with Optikrik I Device (Measuring range: 150÷600 N) (Fig. 9.9.7) The original pressure is P=300 N and after working a while it is P=230 N.

ATTENTION:

NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DESTROYED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION

Loosen the contra nuts (Fig. 9.9.8), loosen light the bolt(4) and bolt(5) of the tension device (Fig. 9.9.6), and adjust the tension with the nut shown in (Fig. 9.9.9). When the right tension is reached: close the contra nuts and the bolts of the support. Reassemble in the same manner.

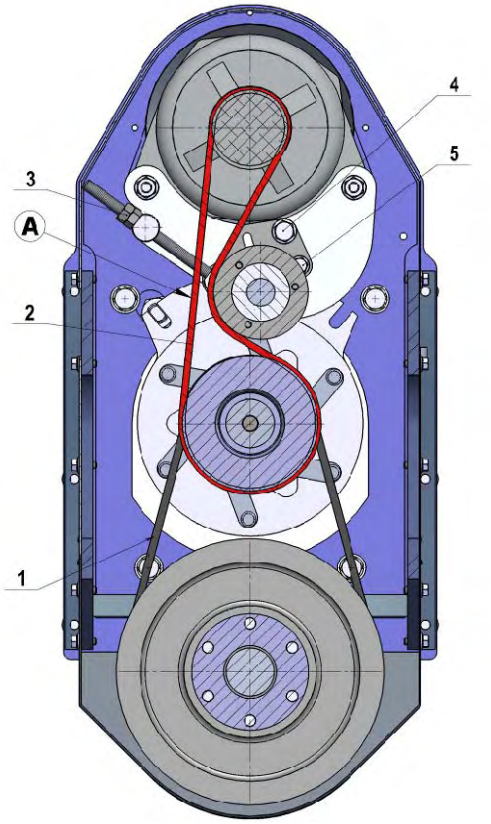


Figure 9.9.6

Figure 9.9.7

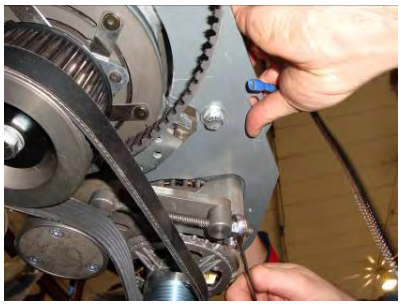


Figure 9.9.8

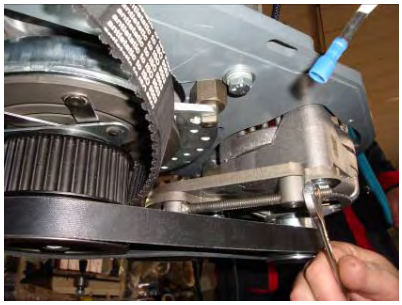


Figure 9.9.9

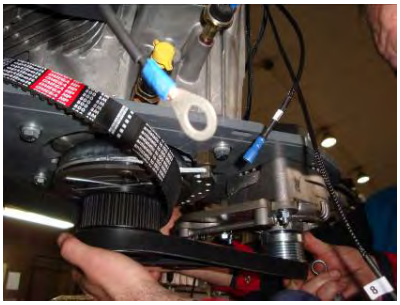


Figure 9.9.10

- Upper timing belt (6) (Fig.9.9.1)

The belt tension can be tested with a Frequency tension Tester Optibelt 3 TT or manual by pushing with a force of 8 kg or 17.6 lbs in point A (Fig.9.4.5), the deflection of the belt must be 3.44 mm or ±0,135Inch (Fig.9.4.5). It is recommended that the tensioning of the belt be measured with a Frequency tension Tester Optibelt 3 TT . The tension of the belt must be (200÷210) 1/s.

Figure 9.4.2

Figure 9.4.3

ATTENTION:

NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DESTROYED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION

Screw slightly the six bolts (Fig.9.4.2) and tighten the belt screwing the screw (4) (Fig.9.4.5)(Fig.9.4.3).

When the tensioning is made then screw the six bolts (Fig.9.4.2) and check again the tension of the two timing belts.

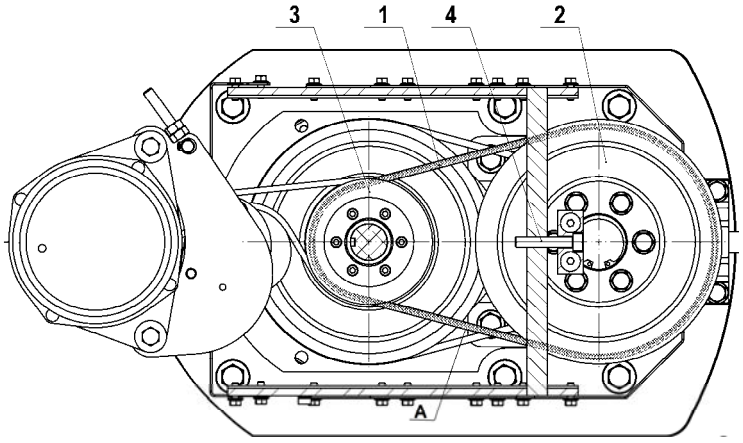


Figure 9.4.5

9.10 TENSIONING AND REPLACING THE TRANSMISSION BELT

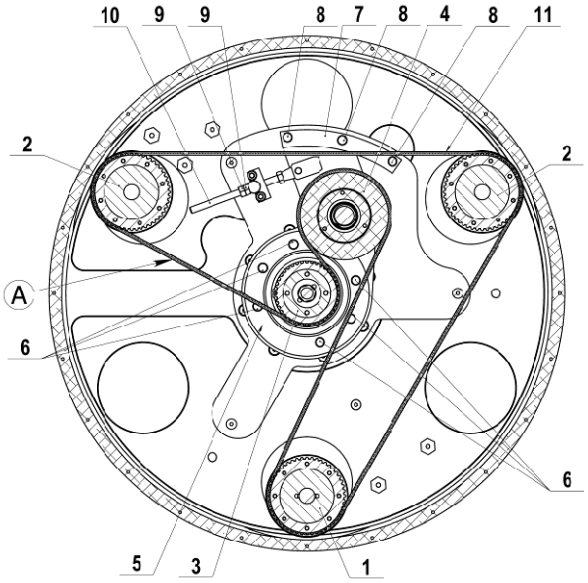


Figure 9.10

The belt tension can be tested with a Frequency tension Tester Optibelt 3 TT or manual by pushing with a force of 24 kg or 53 lbs in point A(Fig.9.10), the deflection of the belt must be 6 mm or ± 0,23 Inch. It is recommended that the tensioning of the belt be measured with a Frequency tension Tester Optibelt 3 TT . The tension of the belt must be 105÷115 1/s.

NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DESTROYED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION

To change the tension, LOOSE THE 6 BOLTS in the middle (Fig.9.10-6), loosen also on the half moons the bolts (Fig.9.10-8), loosen the contra nuts (Fig.9.10-9).
When the belt is tighten, screw the contra nuts and bolts in reverse sequence.

9.11 REPLACING THE PULLEYS

Take the belt tension away (see the previous paragraph).
After removing the belts, unscrew the four bolts of the pulleys on top o

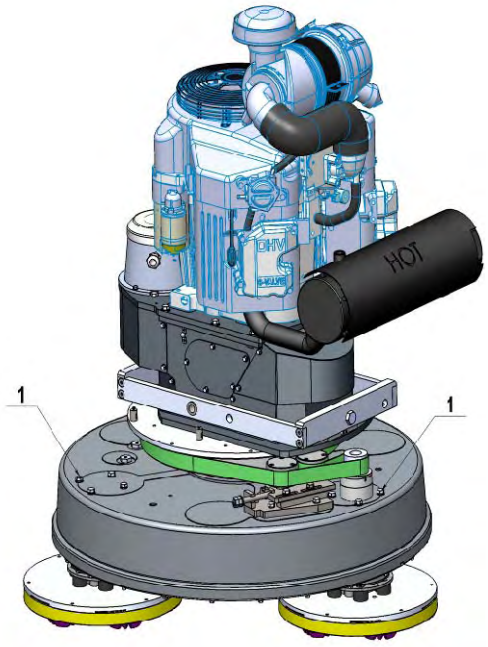


Figure 9.11

9.12 REPLACING THE WHEEL

Lift the lorry on the side you need to change the wheel and place an wooden part so the wheel is on the air. Unscrew the four bolts and take the wheel.

Figure 9.12.1

Figure 9.12.2

Figure 9.12.3

9.13 REPLACING THE BATTERY

Figure 9.13.1

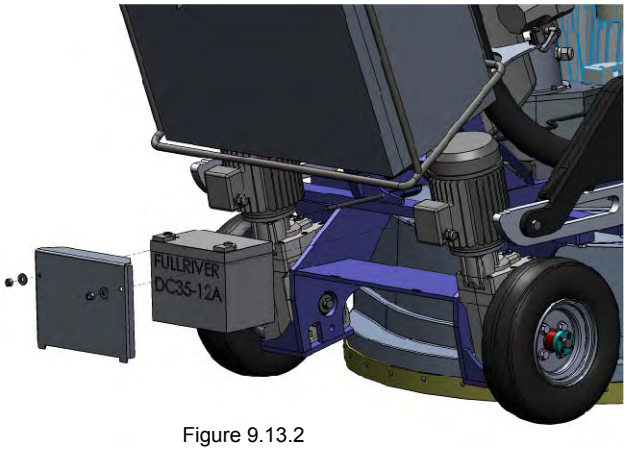


Figure 9.13.2

9.14 REPLACING THE WATER TANK

Figure 9.14.1

Figure 9.14.2

◆ Types of Alarms, Faults, and Errors

Check the LED operator for information about possible faults if the drive or motor fails to operate. *Refer to Using the Digital LED Operator on page 70*.

If problems occur that are not covered in this manual, contact the nearest Yaskawa representative with the following information:

- Drive model
- Software version
- Date of purchase
- Description of the problem

Table 6.4 contains descriptions of the various types of alarms, faults, and errors that may occur while operating the drive.

Contact Yaskawa in the event of drive failure.

Table 6.4 Types of Alarms, Faults, and Errors

Type	Drive Responses to Alarms, Faults, and Errors
Faults	When the drive detects a fault: • The digital operator displays text that indicates the specific fault and the ALM indicator LED remains lit until the fault is reset. • The fault interrupts drive output and the motor coasts to a stop. • Depending on the setting, the drive and motor may stop via different methods than listed. • If a digital output is programmed for fault output (H2-☐☐ = E), it will close if a fault occurs. • When the drive detects a fault, it will remain inoperable until that fault has been reset. *Refer to Fault Reset Methods on page 264*.
Minor Faults and Alarms	When the drive detects an alarm or a minor fault: • The digital operator displays text that indicates the specific alarm or minor fault and the ALM indicator LED flashes. • The motor does not stop. • One of the multi-function contact outputs closes if set to be tripped by a minor fault (H2-☐☐ = 10), but not by an alarm. • The digital operator displays text indicating a specific alarm and ALM indicator LED flashes. • Remove the cause of an alarm or minor fault to automatically reset.
Operation Errors	When parameter settings conflict with one another or do not match hardware settings (such as with an option card), it results in an operation error. When the drive detects an operation error: • The digital operator displays text that indicates the specific error. • Multi-function contact outputs do not operate. • When the drive detects an operation error, it will not operate the motor until the error has been reset. Correct the settings that caused the operation error to reset.
Tuning Errors	Tuning errors occur while performing Auto-Tuning. When the drive detects a tuning error: • The digital operator displays text indicating the specific error. • Multi-function contact outputs do not operate. • Motor coasts to stop. • Remove the cause of the error and repeat the Auto-Tuning process.

◆ Alarm and Error Displays

■ Faults

When the drive detects a fault, the ALM indicator LEDs remain lit without flashing. If the LEDs flash, the drive has detected a minor fault or alarm. *Refer to Minor Faults and Alarms on page 240* for more information. An overvoltage situation trips both faults and minor faults, therefore it is important to note whether the LEDs remain lit or if the LEDs flash.

LED Operator Display		Name	Page
bUS	bUS	Option Communication Error	*242*
CE	CE	MEMOBUS/Modbus Communication Error	*242*
CF	CF	Control Fault	*242*
CoF	CoF	Current Offset Fault	*242*
CPF02	CPF02	A/D Conversion Error	*242*
CPF03	CPF03	PWM Data Fault	*243*
CPF06	CPF06	Drive specification mismatch during Terminal Board or Control Board replacement	*243*
CPF07	CPF07	Terminal Board Communication Fault	*243*

LED Operator Display		Name	Page
CPF08	CPF08	EEPROM Serial Communications Fault	*243*
CPF11	CPF11	RAM Fault	*243*
CPF12	CPF12	FLASH Memory Fault	*243*
CPF13	CPF13	Watchdog Circuit Exception	*243*
CPF14	CPF14	Control Circuit Fault	*243*
CPF16	CPF16	Clock Fault	*243*
CPF17	CPF17	Timing Fault	*243*
CPF18	CPF18	Control Circuit Fault	*243*
CPF19	CPF19	Control Circuit Fault	*244*

LED Operator Display		Name	Page
CPF20 or CPF21	CPF20or CPF21	RAM Fault	244
		FLASH Memory Fault	244
		Watchdog Circuit Exception	244
		Clock Fault	244
oH3	oH3	Motor Overheat 1 (PTC input)	247
oH4	oH4	Motor Overheat 2 (PTC input)	248
oL1	oL1	Motor Overload	248
oL2	oL2	Drive Overload	248
oL3	oL3	Overtorque Detection 1	249
oL4	oL4	Overtorque Detection 2	249
oL5	oL5	Mechanical Weakening Detection 1	249
oL7	oL7	High Slip Braking oL	249
oPr	oPr	Operator Connection Fault	249
CPF22	CPF22	A/D Conversion Error	244
CPF23	CPF23	PWM Feedback Data Fault	244
CPF24	CPF24	Drive Capacity Signal Fault	244
dEv	dEv	Excessive Speed Deviation (for Simple V/f with PG)	244
EF0	EF0	Option Card External Fault	244
EF1 to EF7	EF1 to EF7	External Fault (input terminal S1 to S7)	244
FbH	FbH	Excessive PID Feedback	245
FbL	FbL	PID Feedback Loss	245

LED Operator Display		Name	Page
GF	GF	Ground Fault	245
LF	LF	Output Phase Loss	245
LF2	LF2	Output Open Phase	246
oC	oC	Overcurrent	246
oFA00	oFA00	Option Card Fault (port A)	246
oH	oH	Heatsink Overheat	247
oH1	oH1	Heatsink Overheat	247
PGo	PGo	PG Disconnect (for Simple V/f with PG)	250
rH	rH	Dynamic Braking Resistor	251
rr	rr	Dynamic Braking Transistor	251
SEr	SEr	Too Many Speed Search Restarts	251
STO	STO	Pull-Out Detection	251
UL3	UL3	Undertorque Detection 1	251
UL4	UL4	Undertorque Detection 2	251
UL5	UL5	Mechanical Weakening Detection 2	251
Uv1	Uv1	Undervoltage	252
Uv2	Uv2	Control Power Supply Undervoltage	252
Uv3	Uv3	Soft Charge Circuit Fault	252
oS	oS	Overspeed (for Simple V/f with PG)	249
ov	ov	Overvoltage	249
PF	PF	Input Phase Loss	250

Note: If faults CPF11 through CPF19 occur, the LED operator will display CPF00 or CPF11.

■ Minor Faults and Alarms

When a minor fault or alarm occurs, the ALM LED flashes and the text display shows an alarm code. A fault has occurred if the text remains lit and does not flash. *Refer to Alarm Detection on page 253*. An overvoltage situation, for example, can trigger both faults and minor faults. It is therefore important to note whether the LEDs remain lit or if the LEDs flash.

Table 6.5 Minor Fault and Alarm Displays

LED Operator Display		Name	Minor Fault Output (H2-□□ = 10)	Page
bb	bb	Drive Baseblock	No output	253
bUS	bUS	Option Card Communications Error	YES	253
CALL	CALL	Serial Communication Transmission Error	YES	253
CE	CE	MEMOBUS/Modbus Communication Error	YES	253
CrSt	CrSt	Can Not Reset	YES	253
dEv	dEv	Excessive Speed Deviation (for Simple V/f with PG)	YES	254
dnE	dnE	Drive Disabled	YES	254
EF	EF	Run Command Input Error	YES	254
EF0	EF0	Option Card External Fault	YES	254
EF1 to EF7	EF1 to EF7	External Fault (input terminal S1 to S7)	YES	255
FbH	FbH	Excessive PID Feedback	YES	255
FbL	FbL	PID Feedback Loss	YES	255
Hbb	Hbb	Safe Disable Signal Input	YES	255
HbbF	HbbF	Safe Disable Signal Input	YES	255
SE	SE	MEMOBUS/Modbus Test Mode Fault	YES	—
oL5	oL5	Mechanical Weakening Detection 1	YES	249
UL5	UL5	Mechanical Weakening Detection 2	YES	251
dWAL	dWAL	DriveWorksEZ Alarm	YES	244
HCA	HCA	Current Alarm	YES	256
oH	oH	Heatsink Overheat	YES	256
oH2	oH2	Drive Overheat	YES	256
oH3	oH3	Motor Overheat	YES	256
oL3	oL3	Overtorque 1	YES	256
oL4	oL4	Overtorque 2	YES	257
oS	oS	Overspeed (for Simple V/f with PG)	YES	257

LED Operator Display		Name	Minor Fault Output (H2-□□ = 10)	Page
ov	ov	Overvoltage	YES	257
PASS	PASS	MEMOBUS/Modbus Test Mode Complete	No output	257
PGo	PGo	PG Disconnect (for Simple V/f with PG)	YES	257
rUn	rUn	During Run 2, Motor Switch Command Input	YES	258
rUnC	rUnC	Run Command Reset	YES	258
UL3	UL3	Undertorque 1	YES	258
UL4	UL4	Undertorque 2	YES	258
Uv	Uv	Undervoltage	YES	258

■ Operation Errors

Table 6.6 Operation Error Displays

LED Operator Display		Name	Page
oPE01	oPE01	Drive Unit Setting Error	259
oPE02	oPE02	Parameter Setting Range Error	259
oPE03	oPE03	Multi-Function Input Setting Error	259
oPE04	oPE04	Terminal Board Mismatch Error	260
oPE05	oPE05	Run Command Selection Error	260
oPE07	oPE07	Multi-Function Analog Input Selection Error	260

LED Operator Display		Name	Page
oPE08	oPE08	Parameter Selection Error	260
oPE09	oPE09	PID Control Selection Error	260
oPE10	oPE10	V/f Data Setting Error	261
oPE11	oPE11	Carrier Frequency Setting Error	261
oPE13	oPE13	Pulse Train Monitor Selection Error	261

10. WARRANTY AND RETURNS

Warranty Policy for Lavina® 38GR-S If your warranty card is missing, call your local distributor and request a warranty card or visit us at www.superabrasive.com to download one.
The customer is responsible for filling out the card and mailing it to the manufacturer's address indicated on the card. To ensure registration and activation of the warranty coverage, the warranty card must be mailed to the manufacturer within 30 days from date of purchase. Failure to mail the warranty card within 30 days from date of purchase may void the warranty. Make sure you provide the manufacturer with all the information requested, and most importantly with the distributor's name, machine serial number and purchase date
Superabrasive Inc. guarantees that the original purchaser of the Lavina® 38GR-S machine will be covered against defects in material and workmanship for a period of 2 years from the date of delivery or 500 hours of use whichever comes first.
The following conditions pertain to this warranty:
Applies only to the original owner and it is not transferable.
Machine must not be dismantled and tampered with in any way.
Covered components proven defective will be repaired or replaced at no charge. Covered components include motors, bearings and switches.
This warranty does not apply to any repair arising from misuse, neglect or abuse, or to repair of proprietary parts.
This warranty does not apply to products with aftermarket alterations, changes, or modifications.
This warranty is in lieu of and excludes every condition of warranty not herein expressly set out and all liability for any form of consequential loss or damage is hereby expressly excluded.
This warranty is limited to repair or replacement of covered components and reasonable labor expenses.
All warranty returns must be shipped freight prepaid.

The above warranty conditions may be changed only by Superabrasive. Superabrasive reserves the right to inspect and make a final decision on any machine returned under this warranty. This warranty applies to new, used and demo machines.

Superabrasive does not authorize any person or representative to make any other warranty or to assume for us any liability in connection with the sale and operation of our products.

RETURN POLICY FOR LAVINA® 38GR-S
Lavina® 38GR-S machines may be returned, subject to the following terms:
In no case, a machine is to be returned to Superabrasive Inc. for credit or repair without prior authorization. Please contact Superabrasive Inc. or your local distributor for an authorization and issuance of a return authorization number. This number along with the serial number of the machine must be included on all packages and correspondence. Machines returned without prior authorization will remain property of the sender and Superabrasive Inc. will not be responsible for these.
No machines will be credited after 90 days from the date of invoice.
All returns must be shipped freight prepaid. All returns may be exchanged for other equipment or parts of equal dollar value. If machines are not exchanged, they are subject to a fifteen percent (15%) restocking fee.

11. DISPOSAL

If your machine after time is not usable or needs to be replaced, send the machine back to Superabrasive or a local distributor, where a professional disposal complying with the environment laws and directives is guaranteed.

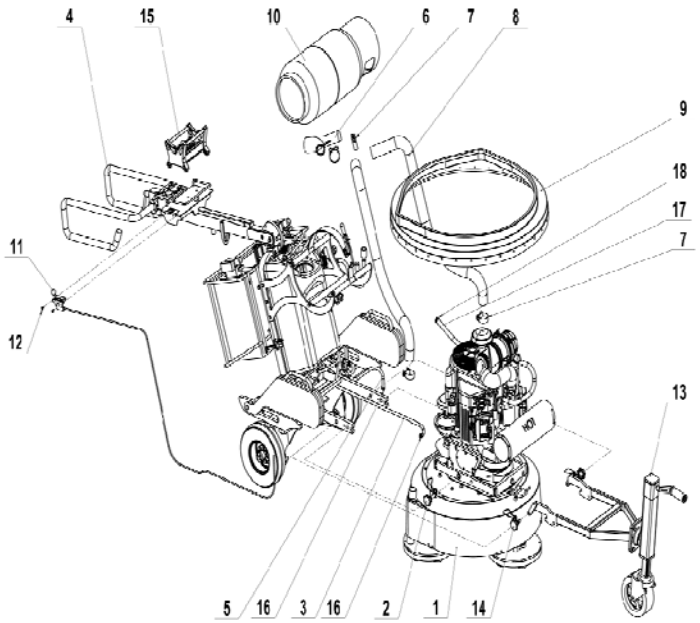
12. MANUFACTURER'S CONTACTS

If you need to contact Superabrasive Inc. with technical support questions, below is the contact information.

Address; 9411 Jackson Trail Road, Hoshton GA 30548, USA
Email: info@superabrasive.us
Tel.: 706 658 1122
Fax: 706 658 0357
Website: www.superabrasive.com

13. SPARE PARTS

ASSEMBLY AND PARTS SPECIFICATIONS

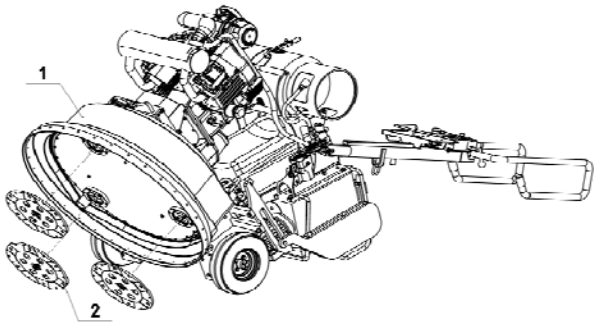


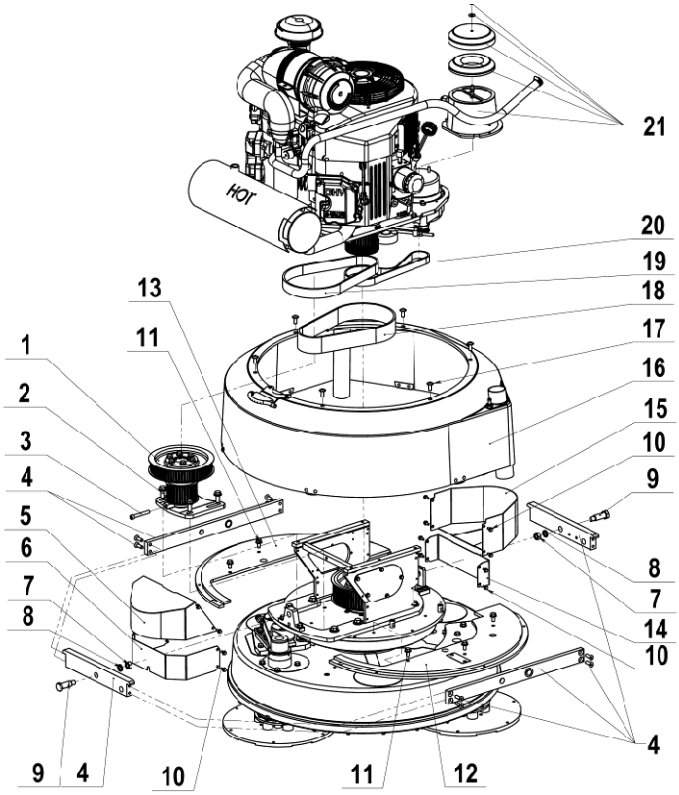
13.1. LAVINA®38GR-S GENERAL PARTS

Model	No.	Item No.	Description	Pcs.
L38GR-S	1	L38GR-S-10.00.00	Disc Assembly	1
L38GR-S	2	L32S.05.00.00	Pin Assembly	2
L38GR-S	3	MAR 8.1400	Tube	1
L38GR-S	4	L38GR-S-20.00.00	Carriage	1
L38GR-S	5	MAR 8.400	Tube	1
L38GR-S	6	L32B-00.00.00.00.01	Air Duct Three-Way	1
L38GR-S	7	SGB W1 56-59	Clamp	4
L38GR-S	8	d50xL1300	Vacuum Hose	2
L38GR-S	9	L38GR-S-30.00.00	Guard Assembly	1
L38GR-S	10	33.5# TW 23.6-WC 80.0	Horizontal Aluminium Propane Tank	1
L38GR-S	11	109894	Throttle 96"	1
L38GR-S	12	M6x16DIN6921	Bolt	2
L38GR-S	13	L38GR-S-40.00.00	Third wheel	1
L38GR-S	14	L32S-04.02.00	Pin Assembly TW L32S	2
L38GR-S	15	HATOX Set	Remote Control Set	1
L38GR-S	16	10-16/DIN 3017	Clamp	2
L38GR-S	17		Tube	1
L38GR-S	18	F0708750	Clamp	1

13.2. LAVINA®38GR-S TOOL HOLDER FOR MACHINES PARTS

Model	No.	Item No.	Description	Pcs.
L38GR-S	1		LAVINA 38GR-S	1
L38GR-S	2	A35.00.00	Tool Holder A35	3

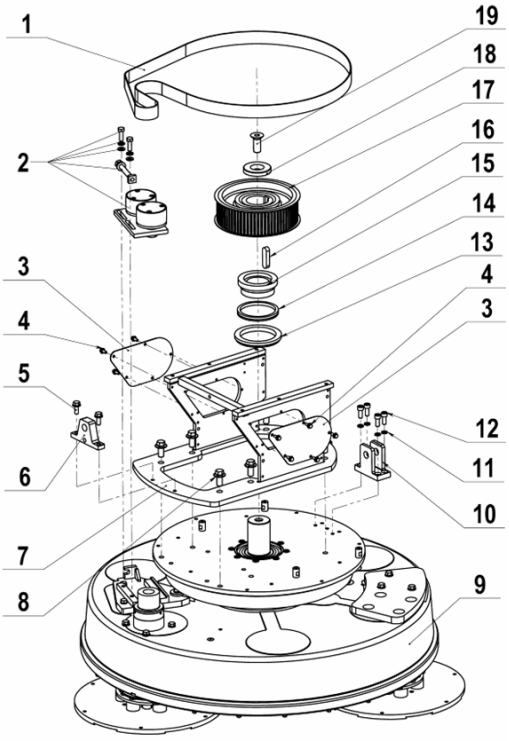


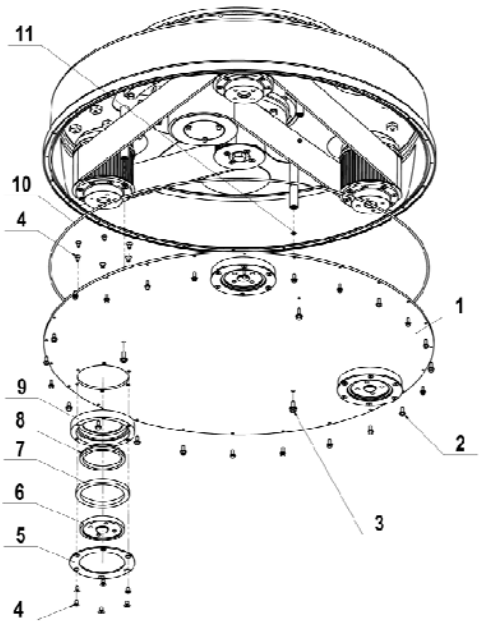


13.3. LAVINA®38GR-S TOP COVER ASSEMBLY AND MOTOR SUPPORT PARTS

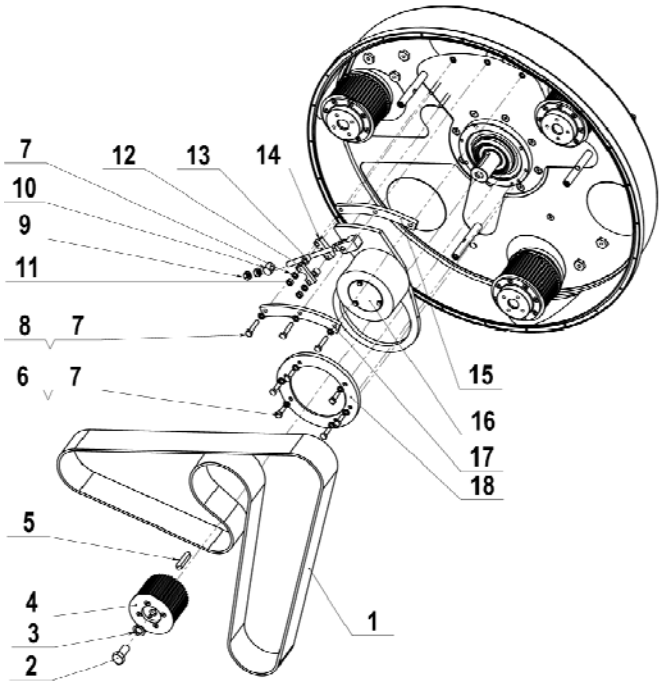
Model	No.	Item No.	Description	Pcs.
L38GR-S	1	L40G-17.00.00	Engine Tensioning Unit	1
L38GR-S	2	M10x25 DIN 6921	Bolt	4
L38GR-S	3	M8x60 DIN7991	Screw	1
L38GR-S	4	L40G-22.00.00	U-joint	1
L38GR-S	5	L38G-S-23.00.00	Front Top Guard	1
L38GR-S	6	L38G-S-10.00.16	Front Down Guard	1
L38GR-S	7	M12DIN934	Nut	2
L38GR-S	8	M12DIN127B	Spring Washer	2
L38GR-S	9	L32-00.00.00.00.02	Bolt	2
L38GR-S	10	M5x12 DIN 6921	Bolt	16
L38GR-S	11	M8x16 DIN 6921	Bolt	6
L38GR-S	12	L38GR-S-26.00.00	Left Top Cover Base	1
L38GR-S	13	L38GR-S-27.00.00	Right Top Cover Base	1
L38GR-S	14	L38GR-S-10.00.13	Rear Down Guard	1
L38GR-S	15	L38GR-S-20.00.00	Rear Top Guard	1
L38GR-S	16	L38G-S-21.00.00	Top Cover Assembly	1
L38GR-S	17	M8x20 DIN 7380F	Screw	6
L38GR-S	18	OMEGAHP8008MHP50	Down Timing Belt	1
L38GR-S	19	OMEGAHP8008MHP30	Top Timing Belt	1
L38GR-S	20	PK698-6	Belt	1
L38GR-S	21	L38G-S-25.00.00	Generator Guard Assembly	1

13.4. LAVINA®38GR-S PLANETARY DRIVE PARTS				
Model	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1	TC-20 EF L1730x30x2	Endless Transmission Flat Belt	1
L38GR-S	2	L32S.17.00.00	Planetary Tensioning Unit	1
L38GR-S	3	L40G-10.00.14	Люк	2
L38GR-S	4	M5x12 DIN 6921	Bolt	10
L38GR-S	5	M8x20 DIN 6921	Bolt	2
L38GR-S	6	L40G-10.00.12	Front carrier	1
L38GR-S	7	L38G-S-15.00.00	Engine base	1
L38GR-S	8	M12x25 DIN 6921	Bolt	6
L38GR-S	9	L38G-10.00.01	Disc	1
L38GR-S	10	L32-01.02.00.00.01	Fork	1
L38GR-S	11	M8DIN7980	Spring Washer	4
L38GR-S	12	M8X20DIN912	Screw	4
L38GR-S	13	L38G-S-10.00.10	Pad for V-Ring	1
L38GR-S	14	TWVA00800	V-Ring Type A	1
L38GR-S	15	L40G-10.00.08	Носач за V-Ring	1
L38GR-S	16	DIN6885A14X9X50	Key	1
L38GR-S	17	L40G-10.00.03	Pulley Unit	1
L38GR-S	18	L38G-S-10.00.17	Front Washer	1
L38GR-S	19	M16x40 DIN7991	Screw	1



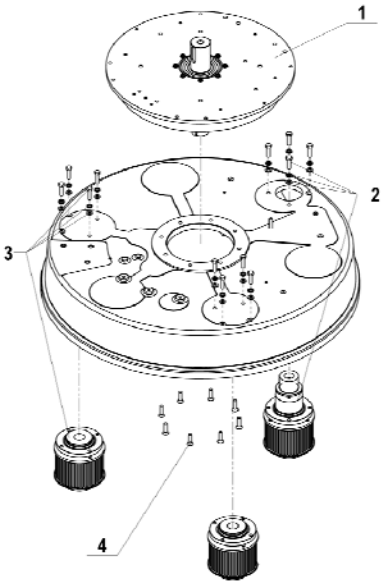


13.5. LAVINA®38GR-S BOTTOM COVER ASSEMBLY PARTS				
Model	*No.*	*Item No.*	*Description*	*Pcs.*
L38GR-S	*1*	*L38G-S-16.00.00*	*Bottom Cover Ass.*	*4*
L38GR-S	*2*	*M5x12 DIN 6921*	*Bolt*	*24*
L38GR-S	*3*	*M6x16 DIN 6921*	*Bolt*	*3*
L38GR-S	*4*	*M6x10 DIN7991*	*Screw*	*36*
L38GR-S	*5*	*L25 LS.14.00.03*	*Outer Cover*	*3*
L38GR-S	*6*	*A37.00.01*	*Adaptor*	*3*
L38GR-S	*7*	*110X90X8.5*	*Felt Ring*	*3*
L38GR-S	*8*	*TWVA00800*	*V-Ring Type A*	*3*
L38GR-S	*9*	*L25LS-14.00.02*	*Flange*	*3*
L38GR-S	*10*	*D4X2X2500*	*Seal*	*1*
L38GR-S	*11*	*D6x2*	*„O-ring"*	*3*



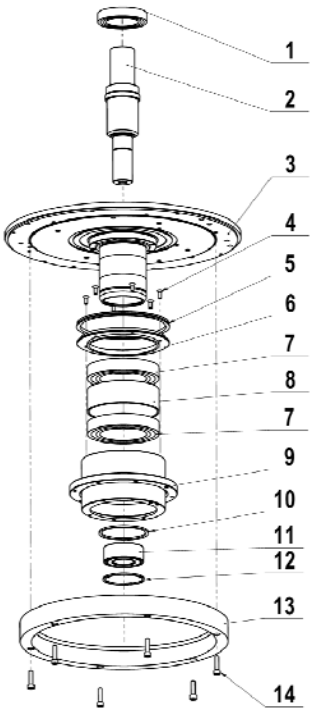
13.6. LAVINA®38GR-S TRANSMISSION BELT PARTS

Model	No.	Item No.	Description	Pcs.
L38GR-S	1	OMEGAHP28008MHP73	Endless Transmission Belt	1
L38GR-S	2	M16X35DIN933	Bolt	1
L38GR-S	3	M16DIN127B	Spring Washer	1
L38GR-S	4	L38G-19.00.00	Central Pulley	1
L38GR-S	5	DIN6885A12x8x56	Key	1
L38GR-S	6	M8x25DIN933	Bolt	6
L38GR-S	7	M8DIN7980	Spring washer	11
L38GR-S	8	M10DIN934	Nut	2
L38GR-S	9	M8x40DIN933	Bolt	3
L38GR-S	10	L32C.14.20.04	Spindle	1
L38GR-S	11	M8DIN934	Nut	2
L38GR-S	12	L25L-10.00.07	Support	1
L38GR-S	13	L25L-10.00.08	Washer	2
L38GR-S	14	L40G-10.00.07	Support	1
L38GR-S	15	L40G-10.00.05	Sector 1	1
L38GR-S	16	L38GR-S-14.00.00	Tensioning Support	1
L38GR-S	17	L40G-10.00.06	Sector 2	1
L38GR-S	18	L38G-S-10.00.04	Cap	1



13.7. LAVINA®38GR-S PULLEY UNIT PARTS

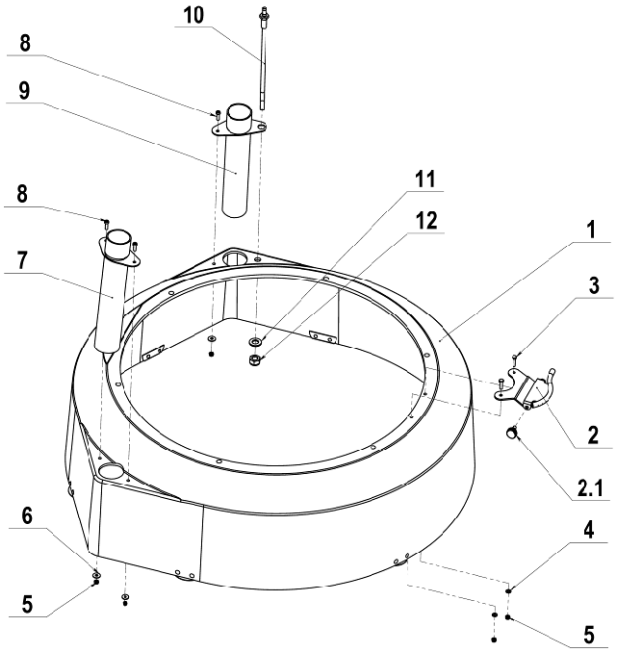
Model	No.	Item No.	Description	Pcs.
L38GR-S	1	L38G-S-11.00.00	Disc Assembly with Planetary Pulley	1
L38GR-S	2	L38G-13.00.00	Driving Pulley Unit	1
L38GR-S	3	L38G-12.00.00	Pulley Unit Assembly	2
L38GR-S	4	M8X30DIN7991	Screw	8

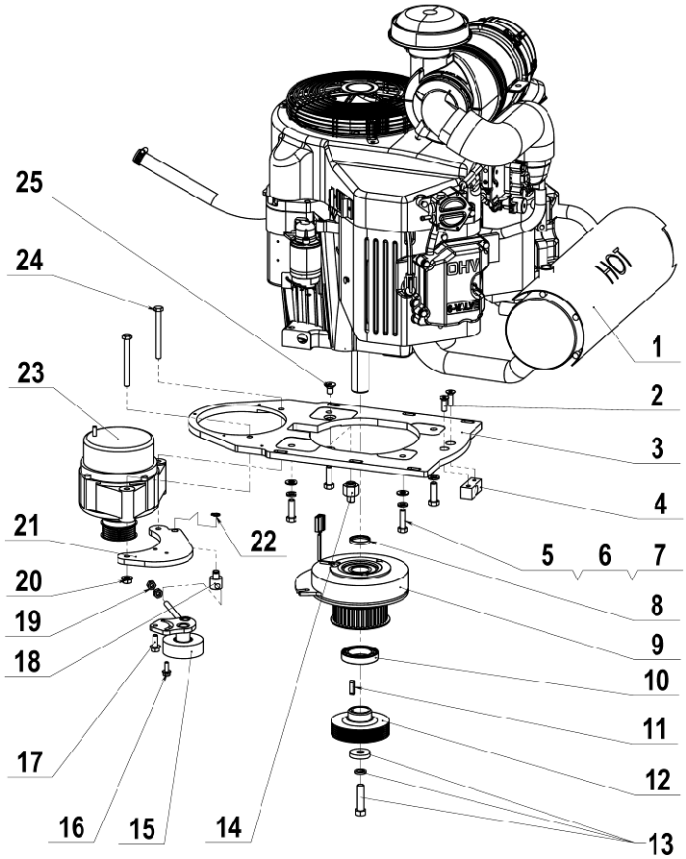


13.8. LAVINA®38GR-S CENTRAL SHAFT BEARING PARTS

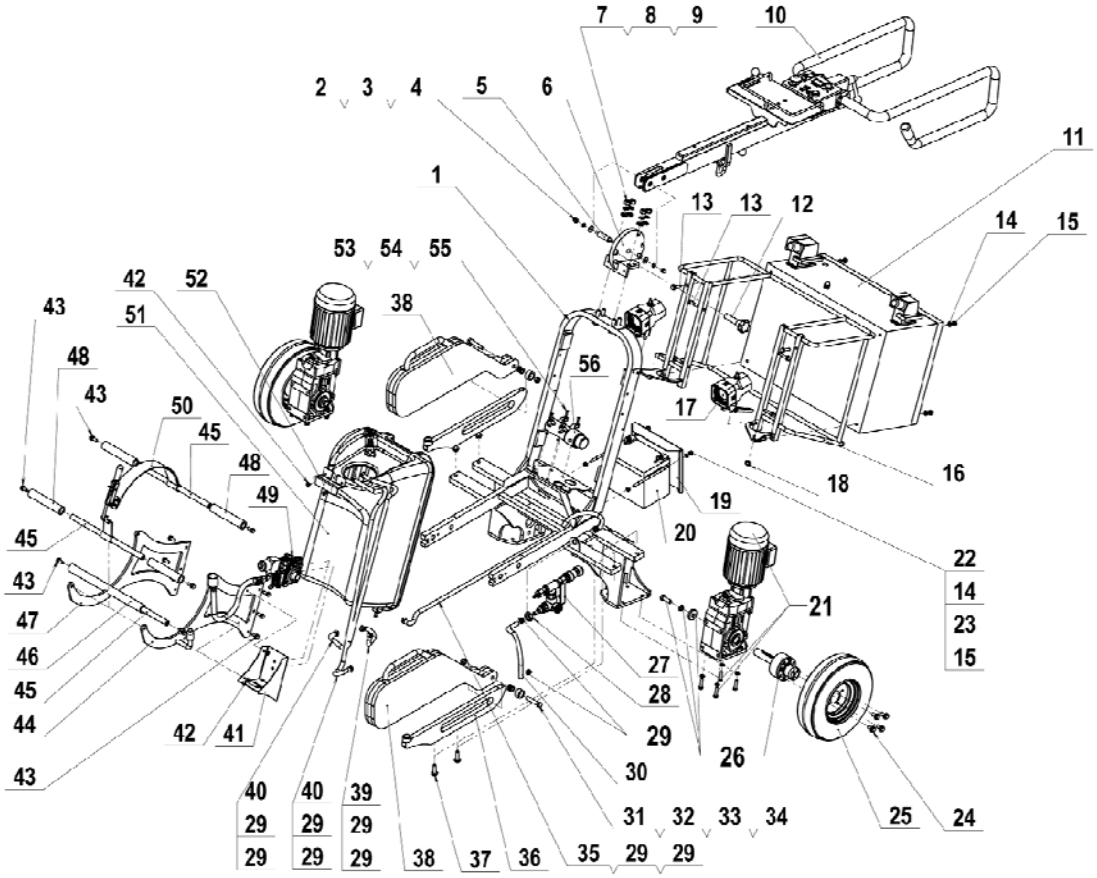
Model	No.	Item No.	Description	Pcs.
L38GR-S	1	6013	Roller Assembly	1
L38GR-S	2	L38G-S-11.00.01	Extension Shaft	1
L38GR-S	3	L38G-S-11.10.00	Disc Assembly	1
L38GR-S	4	M6x16DIN7991	Screw	6
L38GR-S	5	TWVL01700	V-Seal	1
L38GR-S	6	L32D.11.00.03	Cap	1
L38GR-S	7	6019	Roller Assembly	2
L38GR-S	8	L32D.11.00.04	Spacer	1
L38GR-S	9	L32D.11.01.00	Housing	1
L38GR-S	10	B95DIN471	Retaining Ring	1
L38GR-S	11	3208	Roller Assembly	1
L38GR-S	12	A80DIN472	Retaining Ring	1
L38GR-S	13	L32S.11.00.17	Planetary Pulley	1
L38GR-S	14	M8x30 DIN 912	Screw	6

13.9. LAVINA®38GR-S TOP COVER PARTS				
Model	**No**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1	L38G-S-21.00.00	Top Cover	1
L38GR-S	2	A29-30.00	Spray Unit	1
L38GR-S	2.1	H766-21	Knob Bolt	1
L38GR-S	3	M5x20DIN933	Bolt	2
L38GR-S	4	M5DIN125A	Washer	2
L38GR-S	5	M5DIN985	Nut	5
L38GR-S	6	M5 DIN 9021 A	Washer	3
L38GR-S	7	L32D.01.01.00	Vacuum Port	1
L38GR-S	8	M5X16DIN84A	Screw	3
L38GR-S	9	L32S.01.01.00	Vacuum Port	1
L38GR-S	10	L32S-01.20.00	Water Fitting	1
L38GR-S	11	M12DIN125A	Washer	1
L38GR-S	12	M12DIN985	Nut	1

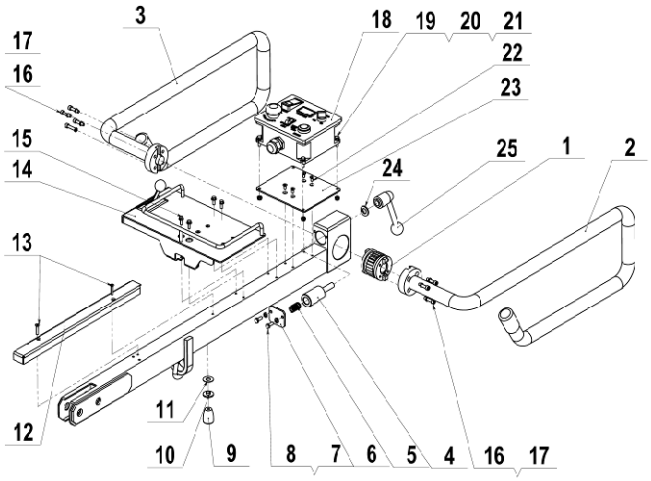




13.10 LAVINA® 38GR-S ENGINE BASE PARTS				
Model	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1	FX921V-BS00-S	Kawasaki Engine	1
L38GR-S	2	M8X25DIN7991	Screw	2
L38GR-S	3	L38GR-S-18.00.01	Engine Base Plate	1
L38GR-S	4	L38G-S-18.00.02	Tensioning Device Support	1
L38GR-S	5	F33008	Washer	4
L38GR-S	6	F33622	Washer	4
L38GR-S	7	F13107	Bolt	4
L38GR-S	8	L38GR-S-18.20.03	Clutch Washer	1
L38GR-S	9	11233	Electric Clutch	1
L38GR-S	10	61908	Roller Assembly	1
L38GR-S	11	DIN6885A6.22x6.22x25	Key	1
L38GR-S	12	L38GR-S-18.20.02	Pulley Unit	1
L38GR-S	13	L38GR-S-18.20.05S	Bolt Set	1
L38GR-S	14	L38G-S-18.00.03	Pin	1
L38GR-S	15	L38GR-S-18.11.00	Tensioner	1
L38GR-S	16	M6x16 DIN 6921	Bolt	1
L38GR-S	17	M8x20 DIN 6921	Bolt	1
L38GR-S	18	L38GR-S-18.10.02	Tensioning Device Support	1
L38GR-S	19	M8DIN934	Nut	2
L38GR-S	20	M8DIN6923	Nut	2
L38GR-S	21	M6DIN127B	Tensioner Base Plate	1
L38GR-S	22	B10DIN471	Retaining Ring	1
L38GR-S	23	A125-1401	Generator	1
L38GR-S	24	M8x85 DIN 931	Bolt	2
L38GR-S	25	M10X16DIN7991	Screw	1

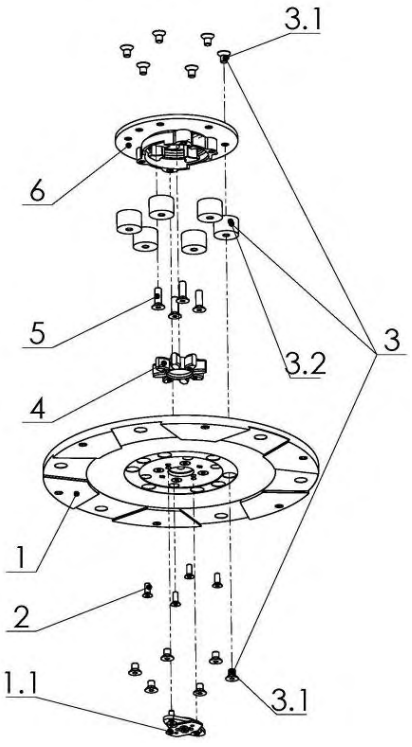


13.11. LAVINA®38GR-S CARRIAGE PARTS								
Model	**No.**	**Item No.**	**Description**	**Pcs.**	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1	L38GR-S-21.00.00	Frame	1	29	10-16DIN3017	Clamp	10
L38GR-S	2	M8DIN1587	Nut	2	30	MAR 8.40	Tube	1
L38GR-S	3	M8DIN127B	Spring Washer	2	31	M12x60DIN931	Bolt	2
L38GR-S	4	M8DIN9021A	Washer	2	32	L38GR-S-20.00.03	Roller weight	2
L38GR-S	5	L32-02.00.00.00.02	Pin	1	33	L38GR-S-20.00.04	Bush	2
L38GR-S	6	L32D.22.00.00	Handle Positioner	1	34	M12DIN985	Nut	2
L38GR-S	7	M12DIN934	Nut	4	35	MAR 8.140	Tube	1
L38GR-S	8	M12DIN127B	Spring Washer	4	36	L38GR-S-20.30.00	Guideway	2
L38GR-S	9	M12DIN125A	Washer	4	37	M10X30DIN6921	Bolt	2
L38GR-S	10	L38GR-S-22.00.00	Handle Assembly	1	38	L38GR-S-20.40.00	Weight	2
L38GR-S	11	L38GR-S-24.00.00	Control Box L38GR-S	1	39	MAR 8.30	Tube	1
L38GR-S	12	L32-02.05.00.00.00	Pin Ass.	1	40	MAR 8.110	Tube	2
L38GR-S	13	M8x35 DIN 6921	Bolt	8	41	L38GR-S-26.00.00	Carrier regulator	1
L38GR-S	14	M8 DIN433	Washer	6	42	M6x10 DIN 7380F	Screw	4
L38GR-S	15	M8DIN934	Nut	6	43	M8X20DIN6921	Bolt	12
L38GR-S	16	L38GR-S-28.00.00	Guard	1	44	L38GR-S-27.10.00	Left bottle holder Assembly	1
L38GR-S	17	L32R-00.00.42	Lamp Unit Incl. Cable	2	45	L38GR-S-27.00.03	Link	3
L38GR-S	18	M10DIN985	Nut	2	46	L38GR-S-27.00.04	Long rubber pad	1
L38GR-S	19	L38GR-S-20.00.05	Battery Guard	1	47	L38GR-S-27.00.01	Right bottle holder	1
L38GR-S	20	DC35-12A	Battery	1	48	L38GR-S-27.00.02	short rubber pad	4
L38GR-S	21	L32R-27.20.00	Gearmotor	2	49	L38GR-S-25.00.00	Regulator set	1
L38GR-S	22	M8DIN934	Nut	2	50	L38GR-S-27.20.00	Strap	1
L38GR-S	23	L38GR-S-20.00.06	Stud Bolt M8x175	2	51	A36.10.00	Tank assembly	1
L38GR-S	24	M10X20DIN6921	Bolt	4	52	L32S.20.00.11	Upper Bracket	1
L38GR-S	25	L32R-27.10.00	Wheel assembly	2	53	M5x20DIN7991	Screw	4
L38GR-S	26	L32R-27.30.00	Wheel Bearing	2	54	M5DIN9021A	Washer	4
L38GR-S	27	L32M-S-20.01.00	Water Connection	1	55	M5DIN985	Nut	4
L38GR-S	28	M20x1.5DIN439B	Nut	1	56	1040	Water Pump	1

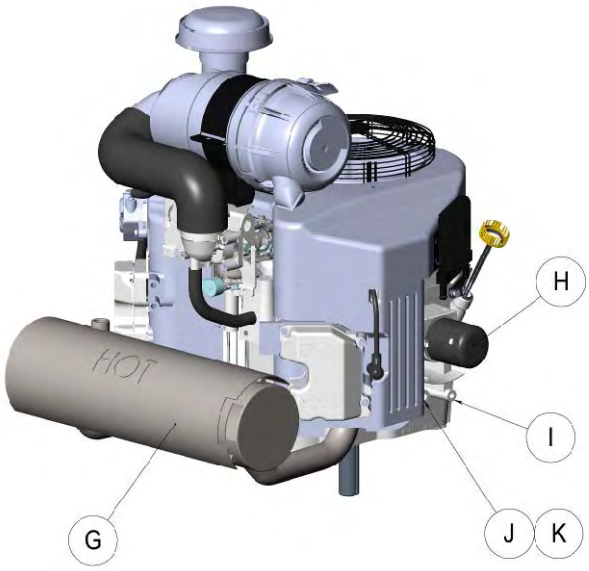


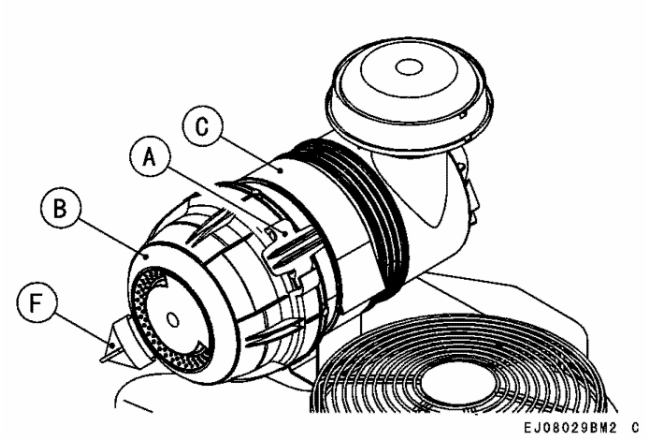
13.12. LAVINA®38GR-S STEERING BRACKET PARTS				
Model	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1	L32B-02.03.00.00.01-01	Sprocket	1
L38GR-S	2	L32B-02.03.02.00.00	Left Bracket	1
L38GR-S	3	L32B-02.03.03.00.00	Right Bracket	1
L38GR-S	4	L32C.23.00.06	Screw	1
L38GR-S	5	L32B-02.03.00.00.02	Spring	1
L38GR-S	6	L32C.23.00.21	Housing	1
L38GR-S	7	M6DIN125A	Washer	2
L38GR-S	8	M6X16DIN933	Bolt	2
L38GR-S	9	BO751-107-25M08	Knob	1
L38GR-S	10	L32-02.03.00.00.01	Washer	1
L38GR-S	11	L32-02.03.00.00.02	Teflon Washer	1
L38GR-S	12	L38GR-S-20.20.01	Cord Cover	1
L38GR-S	13	M5X25DIN7991	Screw	2
L38GR-S	14	L38GR-S-20.11.00	Stand for remote control	10
L38GR-S	15	M5X12DIN6921	Bolt	4
L38GR-S	16	M6X25DIN912	Screw	8
L38GR-S	17	M6DIN7980	Spring Washer	10
L38GR-S	18	L38GR-S-29.00.00	Control Board	1
L38GR-S	19	M6X20DIN933	Bolt	4
L38GR-S	20	M5DIN125A	Washer	4
L38GR-S	21	M5DIN985	Nut	4
L38GR-S	22	M5X10DIN7991	Screw	4
L38GR-S	23	M12DIN125A	Washer	1
L38GR-S	24	M12DIN125A	Washer	1
L38GR-S	25	GN212.3-28-M12-E	Swivel Bolt	1

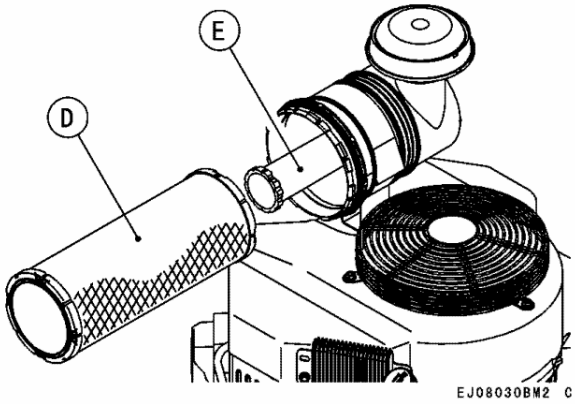
13.13 LAVINA®38GR-S TOOL HOLDER PARTS				
Model	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1	A35.10.00	Quick Change Assembly	1
L38GR-S	1.1	A31.12.00	Keylock Set	1
L38GR-S	2	M6X16DIN7991	Screw	4
L38GR-S	3	A25.00.10-K	Buffer with two screw	6
L38GR-S	3.1	M8X12DIN7991	Screw	12
L38GR-S	3.2	A25.00.10	Buffer	6
L38GR-S	4	A25.00.05-02	Spider	1
L38GR-S	5	M8X25DIN7991-10.9	Screw	4
L38GR-S	6	A31.20.00	Flange	1

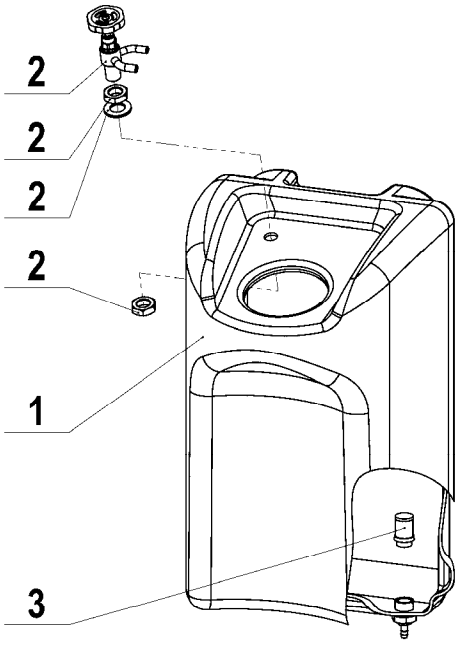


13.14 LAVINA® 38GR-S ENGINE PARTS				
Model	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S			Kawasaki FX921V-BS00-S	1
L38GR-S	A		Retaining clamps	2
L38GR-S	B	11011-7050	Cap - AIR FILTER	1
L38GR-S	C	11011-7047	Case-AIR FILTER	6
L38GR-S	D	11013-7044	Primary Element -AIR FILTER	1
L38GR-S	E	11013-7045	Secondary Element -AIR FILTER	1
L38GR-S	F	11065-7008	Cap	1
L38GR-S	G	FX 921V-11.00.00	Cat Muffler Assy.	1
L38GR-S	H	49065-7010	Oil Filter	1
L38GR-S	I	W1325	Oil Pressure Switch	1
L38GR-S	J	K59071-7004	Joint	1
L38GR-S	K	FE17409029909	Oil Drain Valve	1



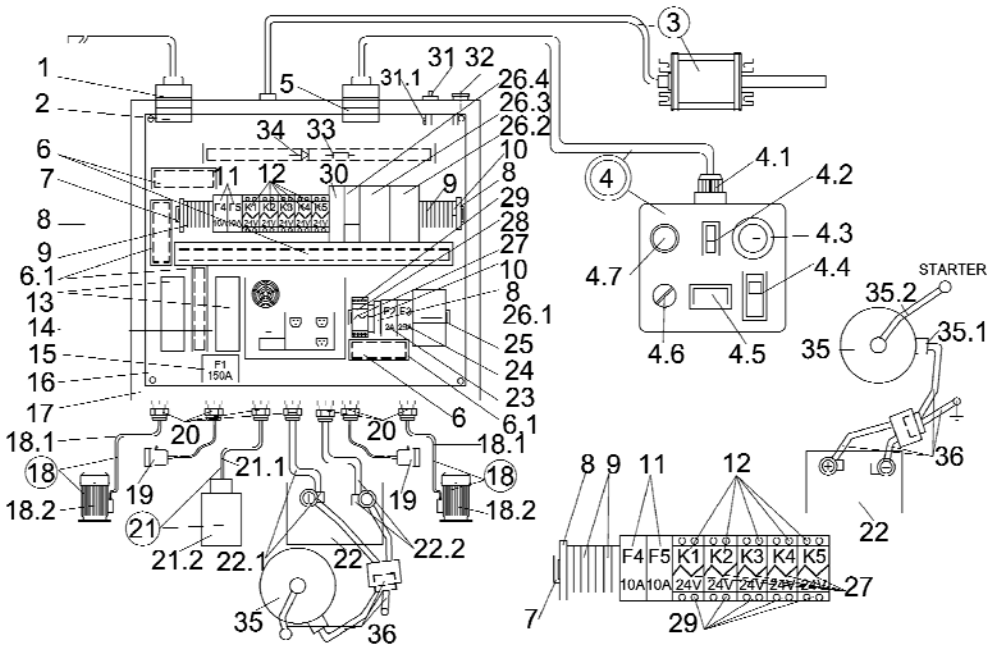






13.15 LAVINA® 38GR-S TANK ASSEMBLY PARTS				
Model	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1		Tank	1
L38GR-S	2	A29.50.00	Regulator	1
L38GR-S	3	1/2"	Filter	1

14. Lavina® 38GR-S Control Box Parts



LAVINA®38GR-S CONTROL BOX PARTS								
Model	**No.**	**Item No.**	**Description**	**Pcs.**	**No.**	**Item No.**	**Description**	**Pcs.**
L38GR-S	1	L38GRS-30.20.00	Panel socket ass./motor/F	1	19	L32-02.06.00.00.00	Lamp Unit Incl. Cable	2
L38GR-S	2	L38GRS-30.19.00	Panel socket ass./motor/F	1	20	L20NS-30.10.01	Cable Gland	7
L38GR-S	3	HATOX set	Remote control set	1	21	L20NS-30.40.00	Water Pump with Cable	1
L38GR-S	4	L38GRS-29.00.00	Control panel.with conn.end plug	1	21.1	L20NS-30.40.01	Cable for Water Pump	1
L38GR-S	4.1	L38GRS-29.00.41	Cable Gland	1	21.2	1040	Water Pump	1
L38GR-S	4.2	W9999	Pump switch	1	22	DC35-12A	Battery	1
L38GR-S	4.3	L38GRS-29.00.43	Emergency Stop Button	1	22.1	L38GRS-30.22.10	Red cable	1
L38GR-S	4.4	W1330	Clutch switch	1	22.2	L38GRS-30.22.20	Black cable	1
L38GR-S	4.5	W4313	Hour Meter	1	23	L32R-S-HV-30.00.11	Automatic Switch 2A	1
L38GR-S	4.6	L20NS-30.10.13	Switch ON/OFF	1	24	L38GRS-30.11.24	Circuit Breaker 25A	1
L38GR-S	4.7	W1301	Start/Stop switch	1	25	L38GRS-30.11.25	Rail /for terminal block/	1
L38GR-S	5	L32SHV-30.40.00	Plug on Control Board ass./female/	1	26.1	L32R-S-HV-30.29.10	Power Unit	1
L38GR-S	6	L38GRS-40.11.06	Rail Cover	1	26.2	L32R-S-HV-30.29.20	Module with 8 Digite Outputs	1
L38GR-S	6.1	L38GRS-40.11.61	Rail Cable Guide	1	26.3	L32R-S-HV-30.29.30	Processor	1
L38GR-S	7	L38GRS-30.11.07	Rail /for terminal block/	1	26.4	L32R-S-HV-30.29.40	Communication Module	1
L38GR-S	8	WK6U6blue	Terminal	3	27	L20NS-30.11.06	Rail Bracket	6
L38GR-S	9	WK4U4grey	Terminal	20	28	L20NS-30.11.05	Rail/12V/	1
L38GR-S	10	WK6U6grey	Terminal	2	29	L20NS-30.11.04	Rail Base	6
L38GR-S	11	L32SHV -30.11.01	Circuit Breaker 10A	1	30	GY001	Gyro	1
L38GR-S	12	L32RS -30.11.05	Rail/24V/	6	31	L38GRS-30.10.31	LED /yellow/	1
L38GR-S	13	L32R-S-HV-30.00.02	Frequency Regulator /Inverter Yaskawa/	2	31.1	L38GRS-30.10.31-1	Resistor	1
L38GR-S	14	L32R-S-HV-30.00.06	Inverter with Load Module	1	32	L20NS-30.10.12	LED /green/	1
L38GR-S	15	L32R-S-HV-30.00.05	Automatic Switch 12V 150A	1	33	I1K-0.25	Resistor	1
L38GR-S	16	L38GRS-24.00.02	Metal box plate	1	34	D1K-0.25	Diode	1
L38GR-S	17	L38GRS-24.00.01	Metal box	1	35	A125-1401	Generator	1
L38GR-S	18	L32R-S-HV-30.13.00	Electro motor with cable	2	35.1	L38GRS-30.33.01	Cable Gland	1
L38GR-S	18.1	L32R-S-HV-30.13.10	Cable 4x1	2	35.2	L38GRS-30.35.20	Red cable for starter	1
L38GR-S	18.2	L32R-S-HV-30.13.20	Electro Motor	2	36	CC01-25968	12v Wire Connector	1